

MOTOR AGE

Vol. XXXIII
No. 16

CHICAGO, OCTOBER 18, 1917

Ten cents a copy
Three dollars a year

Champion Toledo Dependable Spark Plugs

More Proof of Superiority

R. S. Marsh, director of
Elgin Scout Car says:—

"It was extremely necessary that our car be equipped with the most reliable spark plugs obtainable; therefore, after careful investigation, we chose the Champion Spark Plug.

"Our trip to San Francisco gave your Spark Plugs perhaps as severe a test as they could have received in any service.

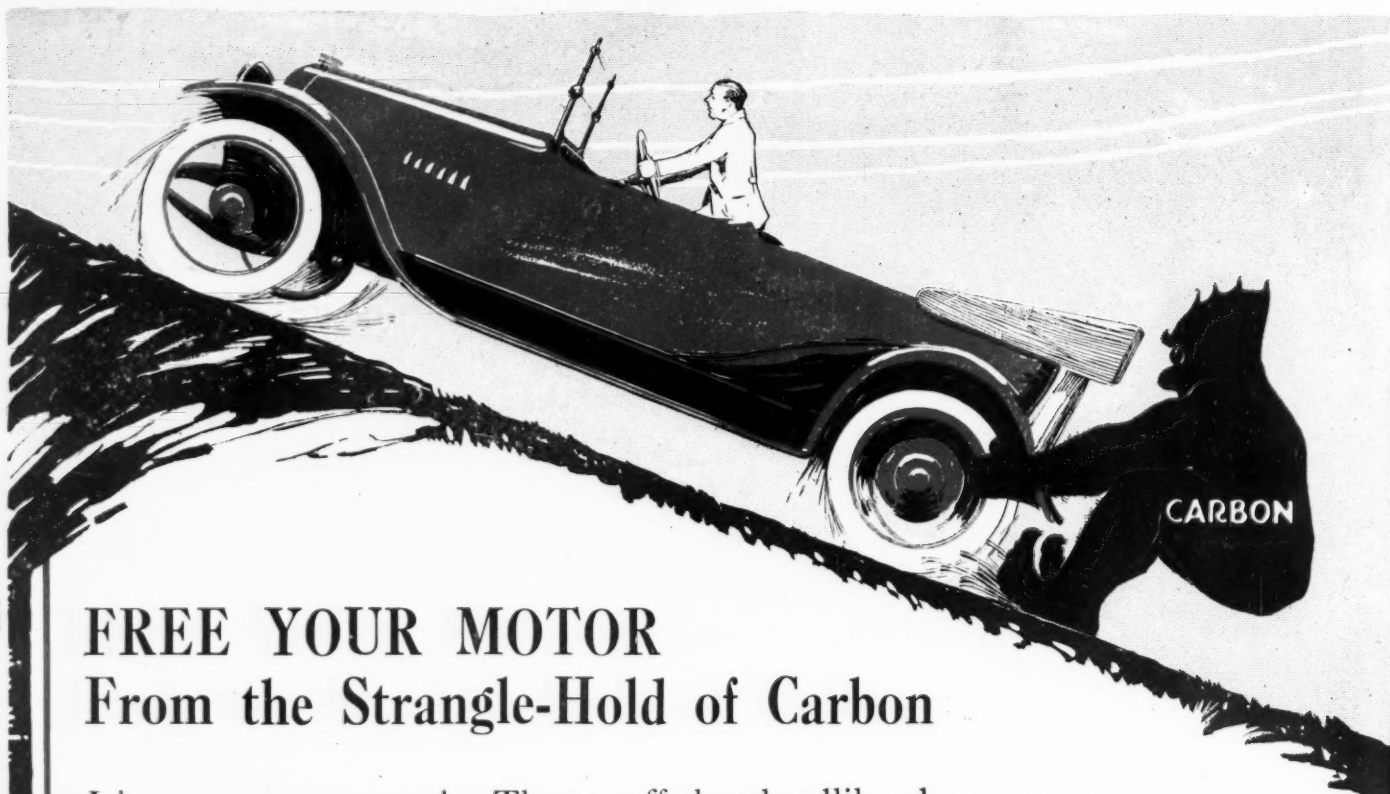
"One hour the temperature would be hot as 118 degrees, and within the next four or five hours the car would again be ascending mountain peaks where the temperature would be as low as 40 degrees.

"We kept accurate record of all data, and are pleased to advise that none of the above conditions affected the Champion Spark plug in the least."

Champion Spark Plug Co.
Toledo, Ohio



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Conical
Price \$1.00



FREE YOUR MOTOR From the Strangle-Hold of Carbon

Liven up your car! Throw off that leadlike drag on your motor. Clean it out with JOHNSON'S Carbon Remover. Your motor will run like new.

JOHNSON'S CARBON REMOVER

used once every 1000 miles, makes any motor immune from carbon trouble.

Carbon is the thief of engine efficiency. Neglected carbon, like rust, is a mechanism destroyer. Constant watchfulness and JOHNSON'S Carbon Remover will protect you against its ravages.

Remember the engine costs more than any other part of your car. Use JOHNSON'S Carbon Remover—give it the care it deserves—and its improved running and hill-climbing ability will be a revelation.

S. C. JOHNSON & SON,
Dept. MA, Racine, Wis.

I enclose \$1.00 for which please send me by prepaid express enough Johnson's Guaranteed Carbon Remover to keep my motor clean for 6,000 miles.

Name

Address

City and State

My Dealer is

Special Offer

For \$1.00 (bill or stamps) we will send you enough Johnson's Guaranteed Carbon Remover to clean an ordinary four-cylinder motor three times. Please give us the name of your dealer.

S. C. JOHNSON & SON
Dept. M. A. Racine Wis.



MOTOR AGE

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On account of more important features, the story on 1918 cars scheduled for this week has been withheld.

NEXT WEEK

New factors in motoring, notably the enormous increases in car thefts, have made necessary radical changes in insurance arrangements. What these are and how they affect motorists are explained in a feature story in MOTOR AGE, issue of Oct. 25.

"NORMA"



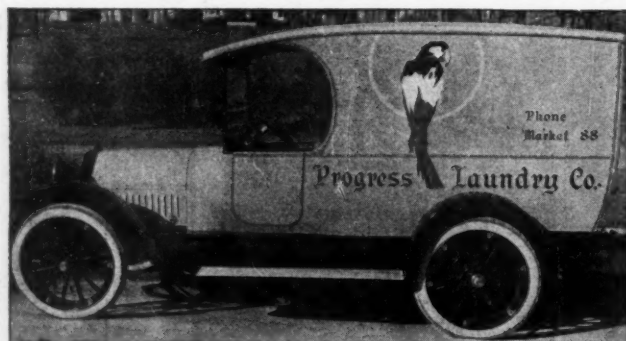
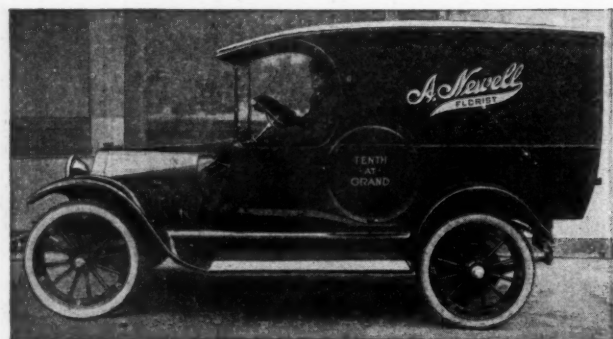
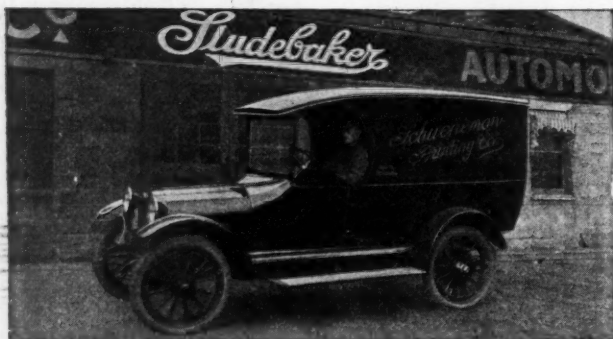
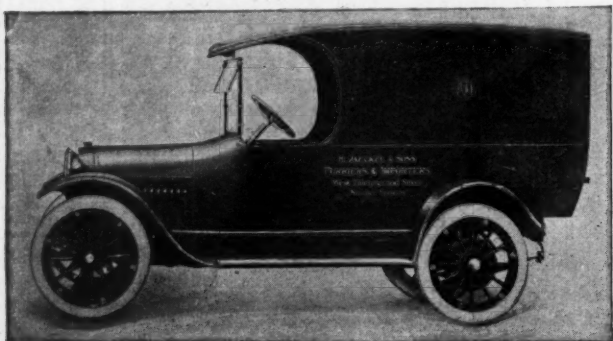
BALL BEARINGS

"Those things called dear are, when justly estimated, the cheapest; they are attended with much less profit to the builder than those which everybody calls cheap." Ruskin

"NORMA" equipped magnetos and lighting generators are found on those good cars in which every dollar of price represents 100 cents of genuine value.

Be Sure. See That Your Electrical Accessories Are "NORMA" Equipped.





PRESTIGE For These Businesses PROFIT For Studebaker Dealers

STUDY these photographs which show Studebaker Half-Ton Panel Delivery Cars in use in six different lines of business;—only a few of the many businesses using this one type of Studebaker Commercial Car, alone.

In fact, it is difficult to think of any kind of retail or wholesale business which could not add prestige to its reputation and make savings in its delivery costs by using one of these handsomely appointed, serviceable and dependable Studebaker cars.

Think of the advertising value to the firms which use them. Then think again of the profit to be made in selling these cars to the countless businesses which need them.

This Half-Ton Panel Delivery Car at \$985 is but one of six Studebaker Commercial Cars ideally adapted to fifty-one different businesses.

There is, also, a Half-Ton Express at \$960, a Half-Ton Station Wagon at \$985, a One-Ton Express at \$1400, a One-Ton Stake Body at \$1450 and a 16-Passenger Bus at \$1600. All prices f. o. b. Detroit.

Write for detailed information

Studebaker

Detroit, Mich. South Bend, Ind. Walkerville, Ont.

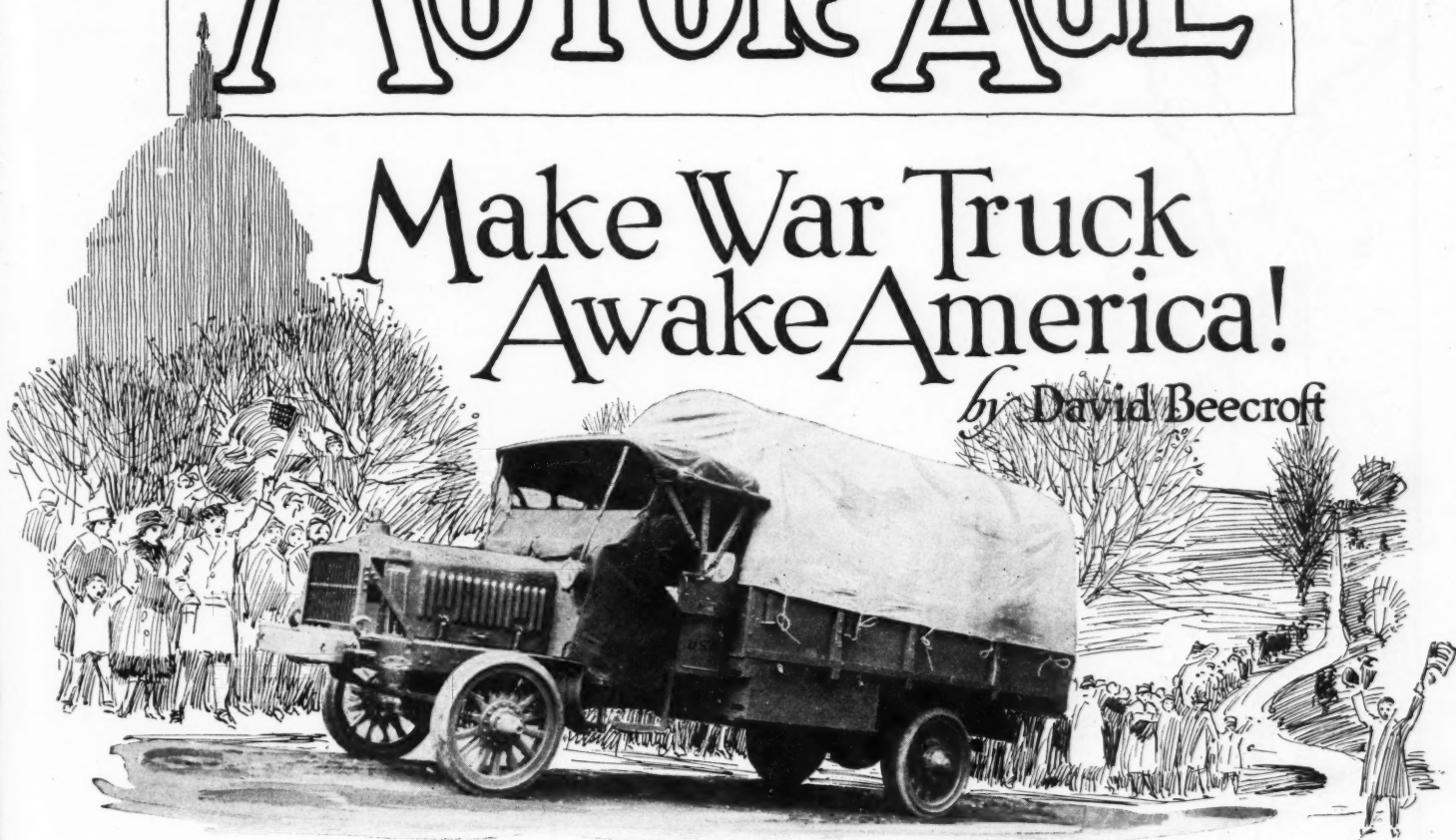
Address all correspondence to South Bend



MOTOR AGE

Make War Truck Awake America!

by David Beecroft



THE standardized war truck is too good a war accomplishment to be hid under the proverbial bushel. It should be heralded from the airplane. It should be proclaimed to the four corners. It is an accomplishment to be proud of, to boast about. Every one of the 70,000,000 persons in this country who are over twelve years of age should know all about it. It represents a new thought in national and perhaps international efficiency. It is a new connecting link between government and industries. It establishes a new relationship between war and commerce. It is one of the fitting products that should be evolved in this war of industries.

From a Composite Brain

This new war truck represents the conception of a composite brain. Fifty or more engineers worked upon it. They wrote into its design the best engineering practice. Experts in designing parts to permit of rapid production incorporated in it the best in production ideals. The truck is much more than merely a new truck model. It cannot be thought of in such a relationship. The spirit back of the truck must be known before it can be appreciated.

Glance for a moment at what prompted the present Liberty aviation engine. The conception of this engine came from an article from the pen of W. F. Bradley, MOTOR AGE correspondent on the war front. Mr. Bradley told of the difficulties France was having with thirty-four different models of aviation engines. He told of how the design of these was such as not to admit of rapid production. The engines

were largely the work of individuals, too often the engineering conception of an individual rather than of a group of individuals. This was the keynote that Jesse G. Vincent, now Major Vincent, seized upon. He concluded that if America were to get into the air war quickly and efficiently it must get airplanes in quantities. To get airplanes in quantities meant to make them in quantities. To make them in quantities meant to so design the parts as to admit of quick manufacture without detracting from quality. It meant a good aviation engine and to get such meant not the ideals of one but of several. It meant extracting the best from existing engines and combining all of these bests into one new engine.

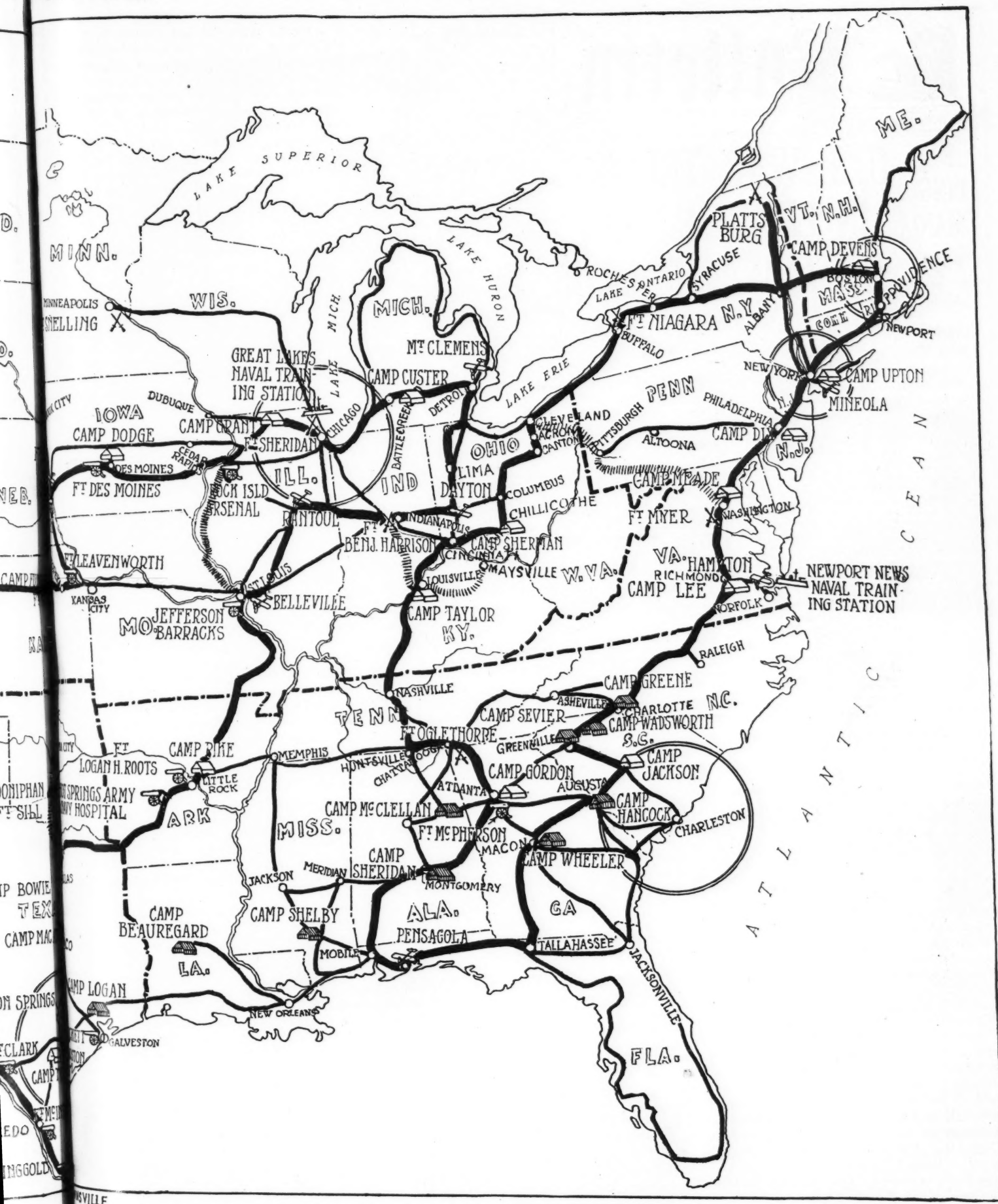
Reverting to the war trucks: It was conceived on the shell-torn fields of France. It was born in the midst of war din. It took its first vague shape under bursting shrapnel. It assumed more definite form in the great groupment repairshops for motor trucks back of the line in France, where a score or more of different motor trucks are being overhauled daily. Here the evils of lack of standardization caught the practised eye of General Chauncey B. Baker, who is now in charge of the entire transportation task of Uncle Sam's army. General Baker last May saw the almost fatal evil of lack of standardized trucks. He saw how lack of standardization meant waste of money, waste of Liberty bonds. He saw in the lack of standardization the loss of lives of American boys who are soon to be in the front line trenches. He saw

increased casualty lists if lack of truck standardization was to be let go as it had gone. He saw great buildings filled with clerks engaged solely on the work of handling records for the huge quantities of spares needed for a score of different makes of trucks. He saw lines of communication choked because of too many different truck types. He saw man power needlessly wasted. He saw the transportation of shells for our big guns and smaller ammunition for our boys' rifles delayed by too heterogeneous a mass of trucks.

When General Baker returned his mind was made up to correct at least one of the big evils of transportation back of the battle front. His mind was made up to have one type of truck rather than twenty. His mind was made up to cut down the supply of clerks necessary to keep record of the multiplicity of spares. His mind was made up to simplify the work of repairing and overhauling trucks in the great field repair depots.

A Collection of Bests

One way remained to accomplish this—design a standard war truck. Make this the best truck America had brains to produce. Make it a composite truck. Not a truck the conception of Engineer John Smith, who is good on engine design but does not know anything about gearsets or axles or frames. Not the conception of Adam Jones who knows all about gearset design but is a blank on engine principles. Not the conception of Engineer John Doe, who is an authority on steering gears but ignorant on clutches. No. The new war



country can be done than sending one or more of these trucks across the country. Such a movement already is under
 cance can be done with the least retracing of roads. Washington being the center of attention now, we suggest that one
 and skirting the western edge of the Mississippi valley. Another should leave Detroit and make the circuit shown to the west.
 the most highways and such tours would show their efficiency from a military viewpoint during these try-outs



Bulletin

WEDNESDAY, OCTOBER 12, 1917.

One Cent

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U. S. WAR TRUCK IN CITY ON WAY TO WASHINGTON

Ban of Secretary on Great Machine, Assembled "Somewhere in New York State" Is Lifted and Truck Will Be Seen in Parade Here This Morning

The first heavy duty War Truck, designed by the Quartermaster's department, assisted by the Society of Automobile Engineers, was assembled and started running "somewhere in New York state" early this week. The truck arrived in Williamsport late last night. It is of the class B type, 5-ton capacity, and is the result of the co-operation of 50 engineers and more than 200 draftsmen, who worked under the supervision of General Chauncey B. Baker, of the Quartermaster's department in Washington, during August. It is one of the greatest engineering successes of the war, destined to revolutionize army truck work in operation and maintenance and also to play a large part in commercial truck design. Orders for 10,000 trucks have been placed widely over the industry, three or more companies generally receiving the orders for each part. The total weight of shafting is 8,000 pounds. Work on this truck, which is headed for Washington, D. C., where it will be met and escorted into the city by President Wilson, Secretary of War Baker and other officials, displays Herculean work on the part of the Society of Automobile Engineers in their co-operation with the Quartermaster's department.

The speedy work that characterized the Liberty aviation engine has been equaled in the case of the heavy duty War Truck.

The first truck was built under secrecy in a building without windows and lighted only by skylights. The plant was closely guarded by watchmen night and day, small parts were sent to the assembling factory from makers in all sections of the country by registered mail and trusted mechanics and army representatives personally supervised the larger parts shipped by train.

The truck was brought here by eight of the men who have been prominent in its construction and was met here by Allen Samselmer, of Washington, sent here by the department as official observer. It combines the best parts of all the trucks on the market and is a most powerful machine.

At 9:30 o'clock it will start from the City hall with Mayor Hoagland and all the motor cars in the city whose owners are willing to help make the parade thru the streets of the city a big one. Every motor car owner is invited to join.

The trip of the truck thus far has been in absolute secrecy which has only been removed in this city.

Weather Forecast

Eastern Pennsylvania: Partly cloudy and somewhat warmer Friday, followed by rain in afternoon or at night; Saturday rain and colder. Western Pennsylvania: Rain and colder Friday; Saturday snow surges and continued cold.

45TH HELD ITS REUNION YESTERDAY

A Fighting Regiment Which Made a Name For Itself On Battlefield

SPLENDID TRIBUTES
PAID BY SPEAKERS

Mayor Hoagland, Rev. Elliot C. Armstrong, D. D., and Hon. Emerson Collins Addressed the "Boys"

To describe best the feelings of the members of the famous old "Fighting 45th," one of the historic regiments of the Pennsylvania volunteers of the days of '61, as they met last night for their annual "camp fire," no more fitting words could be used than those of the poet, Oliver Wendell Holmes:

"Has any old fellow got mixed with the boys?
If there has, take him out, without making a noise:
Hang the almanac's cheat and the cat-alog's spite!
Old Time is a liar! We're twenty to-night!"

And it was in this splendid and undimmed spirit of youth that both speakers and audience recounted over again the days of the Civil war.

The Reunion.
The sessions of the reunion were held at the City hall.

How much would newspaper items similar to this one, which was published in the Williamsport, Pa., Bulletin, scattered throughout the U. S., mean in winning the war!

truck must be a best truck, a composite truck—designed by the best engineers in the industry and a combination not of untried radical designs but of the best existing designs found in all of the trucks of today.

General Baker's broad dream of idealism in a war truck has been realized. The truck has been made. The first two were assembled last week. They are now on the roads being tested. Orders for 10,000 of these trucks have already been placed and orders for many other thousands will be placed.

NOW COMES MOTOR AGE'S SUGGESTION:

Let us let every one of the 70,000,000 men and women and boys and girls already referred to know about this truck. Send several of these new war trucks from one end of the country to the other. Draft a schedule and have these trucks sent from cantonment to cantonment. Make their trips the triumphal procession of the victor. Have the trucks met in every city and town enroute by special reception committees. Have the truck's arrival the occasion for the greatest celebration at each of the cantonments. Let every enlisted soldier in our great army see the truck, tell him of its prowess, let him see how industry and engineering are standing back of him. Let

him know that when he goes into the trenches he will be sure of ammunition, sure of food, sure of every essential. Let him know that his Government has developed the finest truck that the war can boast of. Let him understand the value of standardization in this truck. Let him see what superior service is going to be possible to every soldier because of this truck. If instead of one war truck a dozen could be sent to every cantonment it would be much better.

But go further: Every one of the 70,000,000 men and women and boys and girls must know the story of the truck. They must see the truck. Its sight will bring the war closer to them. The entire countryside should assemble at the crossroads to see it go by. Its arrival in every city should be an unusual occasion. Its arrival should be accompanied by everything that is patriotic and intended to awaken the populace to what this war means.

As a war propagandist this war truck can do more than a thousand platform speakers. It has an argument of reality that the platform speaker cannot produce. Here is one great example of what our Nation has done to whip the enemy. Here is one of the most unchallengeable arguments of how our industries are working with our Government to win the war. Here

is a bit of evidence that cannot be ruled out of court, evidence which proves that we are making progress and great progress in the war. Here is one more example of the practical way in which we are setting out with true American character to do this great job on our hands.

Wherever there is a town or city in America where there is a pro-Teutonic sentiment, send the truck. It may convince many in that town or city that we are in the war and that we mean business. Send the truck on its invasion trip into every pacifist camp. Get it before every person that is lukewarm on what our Government is doing.

There is conviction in every part of this new creature of war. There is a personal interest in this truck in every home from which a boy has enlisted. There is a personal interest in this truck with every business man who has investments, investments that he hopes to continue and have a permanency during the war so that when it is over they will develop into that business stature that they normally should have. There is a personal interest in this truck for every citizen who cherishes in his heart the preservation of democracy and the assistance of those in other lands who are fighting for the same democracy that we are so proud of.

MOTOR AGE appeals to the war department and to General Baker to send these new war trucks on this great mission for democracy, for our homes, for our soldiers and for everything that is near and dear to us.

More Than Mere Materials

This war truck is more than a composition of steel, wood and iron. It is more than a vehicle to transport 5 tons. It is more than something that will travel 15 or 20 miles per hour. This war truck is an embodiment of that very spirit of democracy which compelled us to enter the war. Its every sinews breathe of democracy.

Democracy made it possible for rival companies to let their engineers get together and create it.

Democracy made it possible for one engineer to give way to another and so arrive at a total of best design, best production and best strength.

The spirit of the truck is the spirit of the Liberty loan.

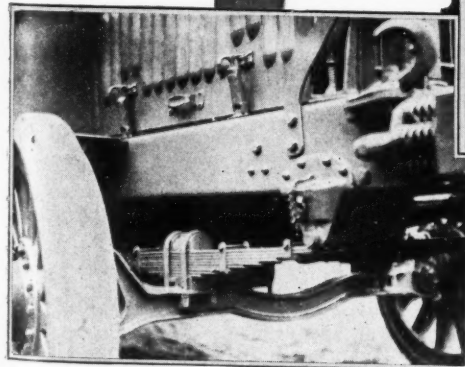
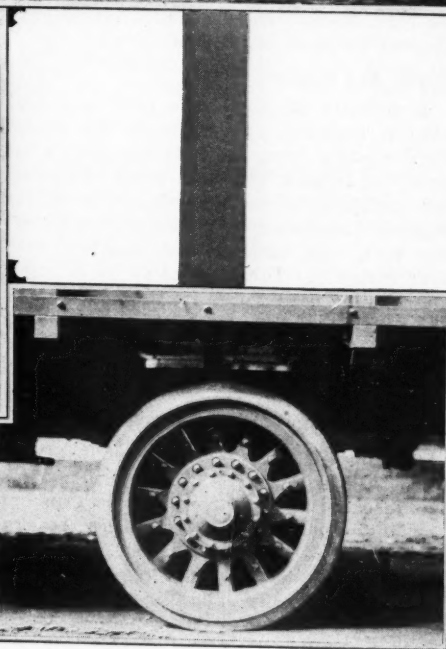
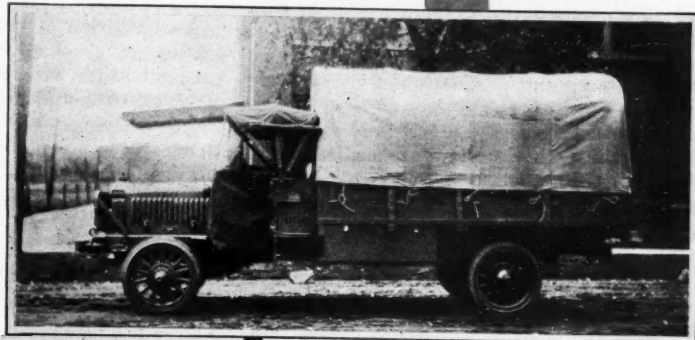
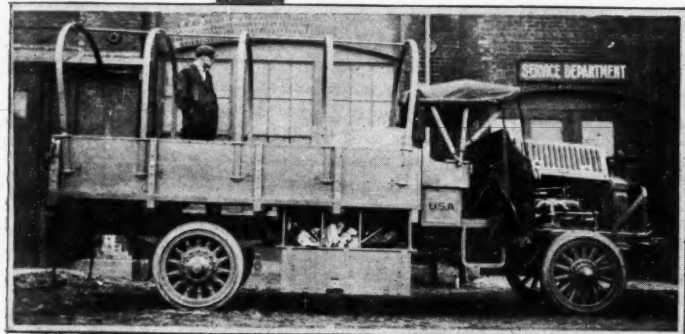
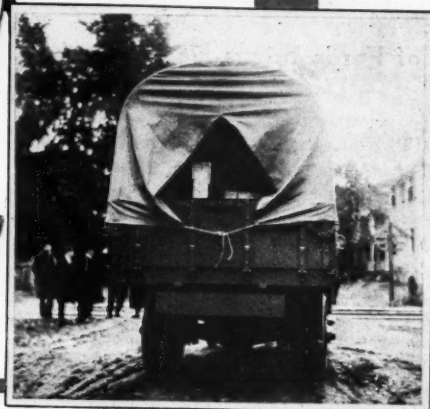
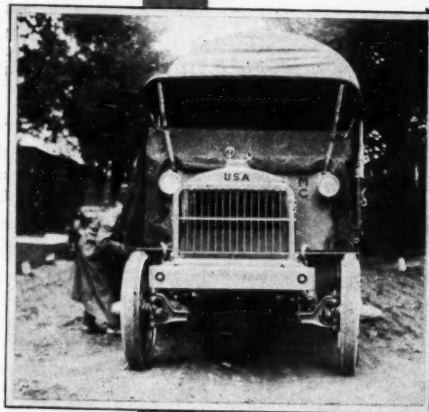
The spirit of the truck is the spirit of the Red Cross.

The spirit of the truck is the spirit of our relief to Belgium.

The spirit of the truck is the spirit that demands that we fight to free Alsace-Lorraine.

Why hide this new democracy under a bushel? Why let this U. S. truck come in just as an ordinary motor truck? No. American blood is not so cold. It has more red corpuscles. The story of the truck must be told as the story of Paul Revere. The story of the truck must be told as the stories of George Washington, and of Abraham Lincoln. Its story ranks with those of the history-famed monitors. It is the Lexington and Bunker Hill of this industrial war.

The Duke of Wellington, the hero of Waterloo, declared that Waterloo was won on the football field when he was a boy. So can the present war be won in the factory. Newton D. Baker, Secretary of War, labeled this war a war of smokestacks.



NEW STANDARD WAR TRUCK

AS viewed from various angles on its maiden trip, the new war truck shows many signs of careful thought in design, both for staunchness and best adaptability to its work in the service of Uncle Sam's boys at the front. Note the bumper at front and rear and the radiator guard.

STARTS TO WAKE UP AMERICA

NOTE the name-plate, "U. S. A." It is MOTOR AGE'S suggestion that it be carried on the war truck into the villages and hamlets throughout the country in combination trips of road test and propaganda tour to awake America to what the war is and the need of war roads.

Car Demand Increases

South and Mid-West Want More Popular-Priced and Used Models

Scarcity of Fords Brings Dealers to Detroit

DETROIT, Oct. 12—An increased demand for cars from the South and Mid-West has been particularly noticeable during the last week. This demand not only extends to cars of the popular-priced class but is noticed also in the used car markets.

The Columbia Motors Co. is holding a convention of officials from all companies manufacturing parts entering into the car. The purpose of this convention is to double the allotment of parts if possible. Because of this demand the Columbia company is now sixty days behind schedule, and if additional contracts can be obtained it will double its present production of twelve cars a day.

Saxon has received 2400 orders during September. These orders are well divided between the touring car and roadster, and a marked increase is noted from the South and Mid-West, particularly in Indiana and Ohio.

Paige has sent H. Krohn, sales manager, on a special trip through all of the southern and western states, including Florida, Georgia, Kansas and Texas, to investigate general business conditions.

Fords Are Scarce

A scarcity of Ford cars both new and used is reported by dealers in the South. Ford dealers from the southern states arrived in Detroit this last week searching for carloads of used Fords. The Motor Mart in Detroit supplied one of these dealers with one carload and another with four carloads. There seems to be a larger quantity of used Fords in Detroit than in the South, and the southern demand makes it profitable to buy in Detroit and pay the freight charges to the South.

U. S. ORDERS F-W-D PARTS

Clintonville, Wis., Oct. 13—The Four-Wheel-Drive Auto Co., Clintonville, Wis., has received an order from the Government for spare parts for F-W-D army trucks, amounting to nearly \$6,000,000. Delivery is to be made with the 3750 class B trucks which the company is building for the Government.

Capt. Walter R. Metz of the Quartermaster's Department, who has been stationed at the Clintonville plant for some time past as inspector, has been detailed for duty at the Pierce-Arrow plant in Buffalo. Capt. Charles P. Daly has been detailed in the F-W-D works.

G. M. EARNS \$3,225,000

New York, Oct. 12—Undivided profits of \$3,225,000 were made by General Motors in September. This compares with \$2,200,110 in September, 1916, an increase of 46.5 per cent. In making this amount, 16,923 cars and trucks were sold, as com-

pared with 13,880 a year ago. Net sales for September totaled \$16,850,000, as against \$11,557,061 a year ago, an increase of \$5,292,939.

The September profits are equal to 3.9 per cent on the common. August profits were \$3,150,000, an increase of 45 per cent over August, 1915, and equal to 3.8 per cent on common. In August and September, the first two months of the new fiscal year, General Motors earned a surplus equal to 7.7 per cent on common, or almost two-thirds of the year's dividend requirements at the present 12 per cent rate.

FORD CLOSED CARS MORE

Detroit, Oct. 16—Special telegram—On account of the increased cost of closed body materials, prices on all Ford closed cars have been raised \$50. The coupelet is \$560; sedan, \$695. No advance in price is announced for other models.

AUSTRALIA MODIFIES RULING

New York, Oct. 12—A modification of the prohibition of the import of motor car bodies into Australia permits the import of all motor cars with bodies ordered prior to Aug. 10, 1917, and shipped from the factory on or before Dec. 31, 1917. Cars not ordered prior to Aug. 10 will be admitted provided each car with a body is accompanied by two chassis.

CADILLAC INCREASES PRICES

Detroit, Oct. 16—Special telegram—The following are the new prices on the type 57 Cadillac: Standard seven-passenger phaeton, roadster, were \$2,590, now \$2,805; victoria convertible, was \$3,750, now \$3,205; brougham, was \$3,535, now \$3,650; town limousine, was \$4,100, now \$4,160; town landaulet, was \$4,250, now \$4,310; limousine, was \$4,085, now \$4,145; imperial, was \$4,285, now \$4,345; landaulet, was \$4,235, now \$4,295; 125-in. chassis, was \$2,295, now \$2,345; 132-in. chassis, \$2,375, now \$2,425; 145-in. chassis, was \$2,475, now \$2,465. These prices include standard equipment f. o. b. Detroit, and purchaser pays war tax in addition.

M. & A. M. WAR COMMITTEE

New York, Oct. 15—The automotive products committee of the war industries board of the Council of National Defense has been formed by members of the Motor & Accessory Manufacturers, as well as a subcommittee known as the military committee, of which Brigadier-General Baker is chairman. Other members include H. L. Horning, Coker F. Clarkson and C. W. Stiger. The M. & A. M. will meet at Cleveland, Ohio, Oct. 18. Prominent bankers and motor car men will speak on credits and other subjects.

N. A. C. C. ENDORSES WAR ROAD

New York, Oct. 13—The board of directors of the National Automobile Chamber of Commerce has endorsed the Chamberlain-Dent bill recently introduced in Congress, which provides for preparation by the War Department of plans for, and the construction and maintenance of, a continuous military highway along or near the Atlantic and Pacific seacoasts and along the southern border of the U. S.

Truck Vital in Defense

Brig. Gen. Chauncey B. Baker Points to Success in Saving Verdun

U. S. Standard Model of Only 7500 Parts

WASHINGTON, D. C., Oct. 15—Brig. Gen. Chauncey B. Baker of the Quartermaster Corps of the Army, in charge of transportation, put the motor truck practically among the first line of defense. General Baker points out that the primary use of the motor truck for military purposes is to carry supplies, but that there are supplementary uses to which motor apparatus can be put, such as furnishing motive power for the tractor and for the transporting of heavy guns. Also, in the carrying of the personnel the motor truck has made itself famous, the General said, particularly at Verdun, where the first advances of the German armies were made on to Paris. This advance furnished a most interesting chapter of the utilization of the military truck and, said General Baker, what would have happened had the motor transport of the German army been more complete than it was probably would have furnished a most interesting chapter of the war.

By contrast, General Baker pointed out, the U. S. truck just completed and successfully tested calls for but about 7500 parts, as against possibly millions needed to supply the seventeen or more different kinds, shapes, and models manufactured in England at the beginning and for some time after the war had started.

MITCHELL MAKING WAR TRUCKS

Chicago, Oct. 16.—It has just become known that the Mitchell Motors Co., Racine, Wis., has been licensed by the Four-Wheel-Drive Co., Clintonville, Wis., to make truck for the Government. Two concerns have been licensed by the Four-Wheel-Drive Co. to manufacture trucks under the contract which this company received direct from the Government. Mitchell has been working on its contract for several weeks.

The exact volume of the contract has not been determined, but the companies licensed by Four-Wheel-Drive will share alike, and the amount of the contract will be limited only to the number of trucks each can produce.

Mitchell has built a substantial addition to its plant to handle this war business, hence, this will not influence production of passenger cars. The new plant for the building of war trucks is ready for occupancy, and the exact amount of the contract both with Mitchell and with others will be known within a few days.

MAXIMUM STEEL PRICES FIXED

Washington, D. C., Oct. 15—Of great interest to the automotive industry, following the prices fixed on certain grades of steel some time ago by the President, on

the recommendation of the War Industries Board, is the fixing of additional maximum prices on steel and steel products which have been approved by the executive, and are now effective, but subject to revision Jan. 1, 1918.

The prices enumerated have been fixed by the President on the assurance of those representing the steel industry that these prices equitably adjust the relations of the steel interests to each other, and will assist them in fulfilling their obligations to give the country 100 per cent of production at not to exceed the prices heretofore announced.

BUSINESS EDITORS CONFER

Chicago, Oct. 13—Editors of the business press finished a three-day convention here to-day of the Associated Business Papers, Inc. Messages from men high in industry, railroads and students of economics made up the program, which sounded the keynote of co-operation between industry and the government for that business of the nation which is war. One session of the convention was devoted particularly to business and the war. Waddell Catchings, member of the Council of National Defense, told of the co-ordination of business and government; transportation problems were brought home to the editors by R. H. Aish-ton, president of the Chicago & North-Western Railway; Professor A. E. Swanson, Northwestern University, outlined the necessity for new merchandising conditions in war time. At the banquet the second day Charles S. Whitman, governor of New York; John W. O'Leary, president of the Chicago Association of Commerce; T. P. "Tay Pay" O'Connor, M. P., Nationalist leader in British parliament, and Douglas Malloch, poet and philosopher, spoke.

KNOBLOCH WITH CLEVELAND

Cleveland, Ohio, Oct. 15—The Cleveland Motor Plow Co. announces the appointment of A. F. Knobloch as general manager of its Cleveland plant. Knobloch resigned as vice-president and general manager of the Cole Motor Car Co., Indianapolis, Ind., about a month ago, and before that time was with the Northway Motor & Mfg. Co. of Detroit.

NEW PERLMAN RIM ANGLE

New York, Oct. 13.—A new turn in the suit of Louis de F. Munger against the Perlman Rim Corp. has been brought about by new testimony from the Perlman company, which states that Mr. Munger is not the owner of the rim patent No. 638,588, upon which he sues. The court has vacated the judgment in favor of Mr. Munger and has set aside Oct. 29 next as the date for the determination of the patent title ownership. The Perlman lawyers claim that the Munger patent is owned by H. F. Herbermann, an attorney, who bought it from a Philadelphia junk dealer last Sept. 20, who has owned it since 1903, when he took over the assets of the Munger Automobile Tire Co., which failed. According to testimony, the Munger Automobile Tire Co. at that time had in its possession the patent involved which had been transferred to it by the National Wheel & Tractor Co., of which Mr. Munger was president.

May Fly Across Atlantic

Italian Inventors Predict Trans-Oceanic Airplanes Between Europe and America

Trips From Milan to Turin are Successful

CHICAGO, Oct. 16—Prediction that immediately after the war there will be trans-oceanic airplanes, each capable of transporting fifty to sixty passengers, between Europe and America, was published to-day by *The Chicago Herald* in a special cable from Milan, Italy. This is in the form of an interview with one of the Caproni brothers, inventors and manufacturers of the mammoth triplanes which now are carrying thirty passengers in comfortable closed cabins in Italy.

"The enormous development of aviation through the war is not only to continue thereafter but to increase by leaps and bounds," Caproni said. "We believe the day is approaching when aerial lines will span continent to continent with aerial trains transporting hundreds of passengers traveling from 135 to 190 m.p.h.

"Future airplanes will have to be gigantic but of light construction, most luxuriously fitted, surpassing any train de luxe ever seen and having all possible modern comforts. They will be built according to the biplane and multiplane systems and fitted with a series of motors varying from 300 to 500 hp., because the plurimotor types obviously afford a genuine guarantee of safety. Breakdowns are almost entirely obviated through the introduction of the multimotor system, which secures greater safety, for should one motor, or even two, break down, the journey can be continued by using a third motor until the nearest landing.

Milan to Turin

"Aviation will be especially useful for quick communication between mainlands and islands, as between England and Ireland and Europe, America and the Antilles, and eventually South America will be linked. Our triplanes already can carry easily as many as thirty passengers in comfortable closed cabins, while many trips have been made by our biplanes with ten passengers between Milan and Turin and back. Also longer journeys have been made in America.

"Recently one of our biplanes piloted by Gabrielle d'Annunzio, with three others aboard, accomplished without a landing a flight covering a distance corresponding, as the crow flies, to the distance between New York and St. Louis."

OAKLANDS HAVE GREATER POWER

Pontiac, Mich., Oct. 15—Refinements which were noted in the 1917 product of the Oakland are increased in this particular line for 1918, these refinements being about equally divided between body lines and mechanical units. A year ago through refinements of design the Oakland Northway engine was increased in horsepower from 35 to 41, at 2500 r.p.m., and due to further

refinements the peak of the curve is now 2600 and the horsepower 44 instead of 41. A year ago those refinements which produced the gain in power were new timing, a different camshaft, and a betterment of many of the factors which had to do with volumetric efficiency. This year the increase in power has been secured by using lighter reciprocating parts through the adoption of aluminum pistons, and also to a better machining on connecting rods. The chassis has been lightened and the whole car has been correspondingly cut down in weight.

Five body styles will be furnished on the Model 34-B, which represents the Oakland line for 1918. Two of these, a five-passenger touring and a three-passenger roadster, will sell at \$990, a roadster coupe at \$1,150, a five passenger sedan at \$1,190, and a four-passenger coupe at \$1,490. A more complete description of the line will appear next week.

NEW ALLENS COST MORE

Fortoria, Ohio, Oct. 16—Few changes, except in refinements and prices, are noted in the Allen line for 1918. This year there is one chassis carrying three bodies, a five-passenger touring, selling at \$1,095, a four-passenger roadster at the same price, and a five-passenger sedan at \$1,395. For those who possibly are not acquainted with Allen construction, it is a four-cylinder car with Hotchkiss drive, floating rear axle, 55-in. semi-elliptic rear springs, and has such equipment as speedometer, ammeter, Stewart vacuum feed, etc. The new Allen bodies are roomy, low hung and well finished. These bodies are of streamline design, featuring a straight line from the level of the front fender top to the rear doors.

CHANDLER EARNINGS TO DATE

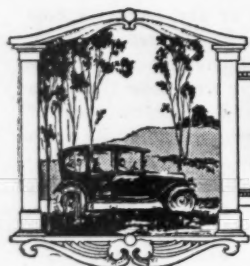
Cleveland, Ohio, Oct. 12—Chandler shipments up to Oct. 1 were close to 14,000, or about 33½ per cent ahead of a year ago. The output of 14,000 machines for ten months compares with 13,073 for the full year 1916.

To date Chandler has earned \$30 a share and for the full twelve months profits are estimated between \$2,300,000 and \$2,500,000, or between \$33 and \$35 a share.

Based upon an invested capital of \$5,000,000, Chandler will have to pay in 1917 an excess profits tax of \$800,000, which is the equivalent of slightly over \$11 a share. So that final earnings for the 70,000 shares should be between \$22 and \$24 a share, or practically twice the \$12 dividend.

BAKER WOULD PROTECT INDUSTRY

Washington, D. C., Oct. 16—Special telegram—Secretary of War Baker has put himself unreservedly on record in opposition to the plan of Representative Kahn of California and others to amend the draft law during the coming regular session of Congress in such a way as to include in draft age all men between eighteen and forty years of age, inclusive. Secretary Baker's stand is based primarily on the inroads which would be made upon industrial concerns were men up to and including forty included in the draft law.



EDITORIAL PERSPECTIVES



The Chicago Speedway

THE Chicago Speedway's signal fizzle in its racing program of Saturday and Sunday but confirms previous criticisms of MOTOR AGE, namely, that good racing cars, good drivers and a good speedway are not a success in themselves but a management that knows every art of the show management business is needed as well. Chicago lacks the latter. The Chicago speedway is as good as could be desired. The drivers present Saturday gave a race that was as full of interest and as good a race as was ever run on an American speedway. But the race was a failure in attendance and receipts. The race on Sunday had to be called off. The first announcement that there was to have

been a Sunday race was that megaphoned from the official grandstand during the Saturday races. There were people seated in the grandstand Saturday who did not hear that announcement. With such methods it is impossible to have successful races. The public still is interested in racing just as in baseball or football, but there must be proper advertising. Speedway racing has suffered for the last three years by inadequate management—management by men who are not familiar with the show manager's tactics and who do not understand how to arouse interest among the great American public. Put good managers on, and even in war times a speedway can show a profit.

The War Truck

THE development of the heavy-duty war truck by the Quartermaster's department, which in the work asked for and received the co-operation of the Society of Automotive Engineers and the truck and parts factories, stands out as one of the great engineering and manufacturing accomplishments of the war. For months after it was suggested that a special war truck was needed because of the experience a year ago on the Mexican border, it generally was argued that there was not any necessity for such a new model and that if a special war truck was a necessity the European governments would have developed one. On the other hand these European governments were buying our trucks of various makes in great numbers and, according to all reports, they were giving good satisfaction.

NOTWITHSTANDING all such arguments it finally was agreed that the necessity for standardization in France was such that a standardized war truck must be built. It was cited that Russia had tens of thousands of cases of spares for different makes of trucks; that these spares called for great corps of clerks to keep records; that they in some cases interfered seriously with the lines of communications; and that there were thousands of cases that would never be opened during the duration of the war. General Chauncey B. Baker, head of transportation for the United States army, visited the French front early this year and reported personally on the imperative needs for standardization and outlined the great advantages of one model of heavy duty truck that would meet all requirements, as well as single models of medium and light duty.

IT was this mandatory condition that determined the Quartermaster's department to go ahead with the standardized war truck. The new truck was a war necessity just as the rifle or machine gun. One of the first rules of the present war is standardization, and as motor trucks are essentials in war transportation trucks must be standardized.

THE spirit of co-operation and sacrifice exemplified by different truck makers in designing this war truck is one of the greatest benefits coming to the truck industry. Over fifty makers sent their best engineers and while a few of them tried to put their particular design over, the dominant spirit of these fifty engineers was to get the best from all engineers and bring all these bests together into the new truck. This has been done. Witness the engine: It is not the engine of any special company

but a composite made up of the best of five or six engine companies. The combustion chamber and valve design is of one company; the lubricating system is that of another company; the crankcase design is that of a third; the piston design that of a fourth; and other details have been taken from others.

NEVER before has it been possible to bring a lot of bests like this together into one whole. One engineer was too proud to use the oiling system of another. But war demands have introduced a new order, call it the order of the bests—the best in cylinder design, the best in oiling system, the best in piston design, the best in valve action, the best in timing gear design and the best in all others. Such can only be considered a great engineering victory. It is one of the fruits of the present war.

BUT there are other merits in the truck, and it is to be hoped that similar merits will be found in the medium and light-duty war truck models not yet ready. The present truck incorporates improvements that were highly desirable in our truck industry. An example is that of gearset design in which the gear ratios have been worked out in relation to motor size, motor speed and truck weight so as to give what is claimed will be a superior truck in point of economy and performance. The gearset design is such as to give much better engine performance with the truck carrying its full load and working in average conditions. The gearset design is such that in hill-climbing work the speed will be better. This problem of gear ratios and engine efficiency is one that had not received sufficient attention and in this respect the new war truck is a distinct improvement over many existing truck designs.

THERE is still another desirable aspect to the war truck: The War Department expects that it will be manufactured largely by perhaps a score or more of makers and sold in commercial channels. Perhaps it will be a little heavy or a little robust for the average commercial use. It would be as a 3½-ton job, but it is literally a 5-ton job and as such it averages very well with the best 5-ton designs. If these war models should enter largely into commercial uses as the War Department anticipates and hopes they will, it will result in a flexibility of truck power very desirable to the nations. Should emergencies arise in which these war trucks in industries would be needed to co-operate with the government, such can be done without clogging the work with a multiplicity of models.

What the War Car Tax Means

Status of U. S. Levy From Standpoints of Owners, Dealers and Manufacturers

JUST how the new war tax on motor cars is to be applied, has not been made certain in all its details, and it is probable that it may be several weeks before the Treasury Department has passed on some of the perplexing questions which will arise in collection of the tax. The atmosphere has been cleared somewhat by a bulletin from the National Automobile Chamber of Commerce sent out by Alfred Reeves, its general manager, and also by a bulletin prepared by the legal talent of the Chicago Automobile Trade Association which gives further interpretation of some of the more intricate points.

The bulletin from the N. A. C. C. contains the preliminary rulings of the Treasury Department on the provisions of the war revenue bill as they relate to motor cars.

By way of letting makers, wholesalers and retailers know the viewpoint of officials of the Internal Revenue office of the Treasury Department, the N. A. C. C. asked certain questions of a general nature. These have been answered by P. S. Talbert, chief of the law division, and Dr. Gilmer Brenizer of the war tax division, and while the opinions given are preliminary and subject to change, they are valuable.

So far as may be determined at the present time, through unofficial opinions from the Internal Revenue Bureau and from lawyers acquainted with motor car law, the following may be considered the status of affairs.

What the Tax Means to the Owner

- 1—No direct tax on owner.
- 2—No tax on cars bought by owners before Oct. 4, 1917.
- 3—Manufacturers are taxed 3 per cent on their selling price of cars sold on and after Oct. 4. Manufacturers undoubtedly will make the dealers pay this tax or a part of it, and such payment undoubtedly will be exacted by the dealer from the final purchaser.
- 4—The tax is levied on the price the seller gets for the car, not the list price, unless actually sold for that. When the price is paid partly in money and partly in other consideration, as a second-hand car, the tax is levied on the price and not on the actual money received.
- 5—The tax is based on the price at which the manufacturer sells the car.
- 6—It is probable that the Treasury Department will hold that a chassis is a motor car and therefore taxable as such without waiting for a body maker to equip it with a body.
- 7—It is probable that the Treasury Department will rule that when extras are shipped with the car and make one sale, the manufacturer shall pay the tax on the full amount. If the car is shipped regular, and a set of wire wheels or another body

purchased extra, such extras would not be taxed.

8—How the law will be interpreted as regards second-hand cars sold by manufacturers or wholesale dealers is in doubt. It generally is believed that the tax probably will not be applied to second-hand cars except when they are turned in as part payment for a new car,—in which case, paragraph 4 applies. See also paragraph 13.

9—There is no direct tax on dealer's sales except that pure wholesalers (selling to dealers only) and combined wholesalers and retailers (dealers who sell both to the final purchaser and to sub-dealers) are taxed 1½ per cent on their selling price of all cars held and intended for sale on or after Oct. 4, 1917. This date may be Oct. 3, but this is not probable. This section interests the final purchaser only if he buys a car which was in the hands of a wholesaler Oct. 4.

10—It is probable that cars bought on a time payment plan, on which payments were not complete on Oct. 4, will not be affected by the tax although it is possible that an interpretation of one clause in the law, may result in a wholesaler being assessed the 1½ per cent tax on any cars which have been delivered but upon which payment has not been completed on a time payment plan which embraces the conditional sale contract, providing such contract was made between May 9, 1917 and Oct. 4.

Cars bought on time payment plan from wholesalers or retailers on the chattel mortgage plan in which ownership changes when the papers are executed and recorded will not be affected under any circumstances. This fine point involving a question of the tax dependent on the type of time-payment plan comes about through the clause which makes the tax become due when the sale is made and a sale means when the title to a car passes from the seller to the buyer. This is a legal matter and is not governed by where the car may be—that is, whether it is actually in the hands of the manufacturer or the seller or in transit between them. In the time-payment plan involving a conditional sale contract, the transaction is not recorded and the title remains in the hands of the wholesaler until payment is concluded. It is possible but not probable that in such case the Treasury Department may rule that the wholesaler may have to pay a tax on the sale of your car, even though you had been running it for four months.

11—The Treasury Department does not look with disfavor on the plan of averaging the tax so that the amount of tax paid by the final purchasers of any one type of car, shall be the same irrespective of the sliding scale of discounts allowed various classes of dealers. The department agrees that it would be fairer to the retail buyer and also to the dealer, as the purchaser then would not be able to figure back and determine from the tax just how much the dealer paid for the car. The Treasury Department is interested in the tax which the manufacturer pays on his car sales and seemingly is completely indifferent as to how he passes the buck to the consumer. In other words, the manufacturer is permitted to charge the dealer a sufficient amount to

cover the war tax and the dealer is permitted to charge the final purchaser with a sufficient amount to cover the war tax but does not need to tell him how much is going for the tax.

What the Tax Means to the Dealer

12—All of the preceding.

13—While the matter is still under consideration the Treasury Department may decide that the revenue bill makes no exceptions in the case of a second hand car held by wholesalers on Oct. 4. It may be that the tax of 1½ per cent may have to be paid, although this was not the intention of the conference committee members. See also paragraph 8.

14—By virtue of the old law relating to purchases by the Government it is believed that the Treasury will rule that cars sold to the U. S. Government are not taxable; however, cars sold to foreign governments are taxable.

15—A dealer selling only to final purchasers direct is not affected by the 1½ per cent tax levied on cars in the hands of wholesalers Oct. 4 or 3, as the case may be.

16—If a so-called branch house is a corporation distinct and separate from that of the manufacturer, even though the manufacturer holds the majority or the whole of the branch corporation stock, then the manufacturer is not liable for any taxes incurred by the branches. That is, in the eyes of this ruling the branch is a wholesaler.

17—In averaging taxes to the final purchaser, to avoid misrepresentation he should not be billed with an item labeled "war tax" unless it is the exact amount of the tax. It is believed there is no objection to the billing being marked "To cover the war tax" and a sum charged on each car to go through all transactions, and the total of which at the manufacturer's end, at the end of the year, will be approximately the amount which the manufacturer has to pay to the Government.

18—To avoid setting a precedent in doubtful cases, inform purchasers from whom you collect the tax that you are in doubt and as soon as the government makes official ruling you will return any collections which are unwarranted.

What the Tax Means to Manufacturers

19—All of the preceding.

20—Manufacturers are taxed 3 per cent on their selling price of cars sold on and after Oct. 4.

21—In making returns to the Government, all articles that are taxable are listed and payment made thereon.

22—On articles on which there is a doubt as to who is liable for taxes, a separate return should be made to the Government

stating reasons why it is believed such articles are not taxable. Do not pay tax on these unless ordered to do so by the Government. This will give the Government the information needed and protect the manufacturer from penalties.

23—The local collector of internal revenue can give the time and mode of paying taxes.

THEY'RE U. S. WORKERS NOW

Allen Sinsheimer, Detroit news editor for MOTOR AGE, has been called to Washington to co-operate with Christian Girl in the production department of the United States army. In addition to handling matters pertaining to truck production Mr. Sinsheimer will continue his work for the Class Journal Co. publications.

Horace de Lisser of the Ajax Rubber Co. has been appointed to General Pershing's business men's staff. He will have the rank of major and will help construct factories behind the fighting lines in France.

M. S. Cooper, formerly manager of the commercial car division of Willys-Overland, Inc., has joined the Quartermaster's Department and will be captain in charge of transportation and transports.

E. W. Tracy of the Premier Motor Corp., has joined the production department of the United States army under Christian Girl. Mr. Tracy was formerly director of purchases.

Guy W. Morgan has joined Christian Girl in the truck department of the United States army at Washington. Mr. Morgan was formerly president of the Abbott Corp.

George H. Caine, foreman of Willys-Overland, Inc., heavy machinery department, received an appointment as captain in the Government aircraft production board. Mr. Caine was formerly connected with the Cadillac Motor Car Co. He left immediately to assume his new duties.

E. A. Callahan, assistant manager of the Omaha branch of the Willys-Overland Co. and formerly with the purchasing department at the factory, has been appointed a captain and, according to reports, will be connected with Major H. L. Shepler in the airplane production department.

E. L. Vail has been released temporarily from charge of the motor car department of the Waltham Watch Co., Waltham, Mass., and has been assigned for duty in the Airplane Engineering Section with the commission of first lieutenant in the Aviation Section of the army.

the list with a subscription of \$10,000 from its treasury. The entire membership of the M. A. D., numbering forty-five, has been appointed as a soliciting committee, with President A. J. March, head of the Curtis Auto Co., Reo distributor, as chairman. Among the large subscriptions already reported to the Milwaukee general committee are: Allis-Chalmers Mfg. Co., \$300,000; Cutler-Hammer Mfg. Co., \$200,000; Pressed Steel Tank Co., \$100,000; Shadbolt & Boyd Iron Co., accessory jobber, \$25,000; Wisconsin Oakland Co., \$25,000; Nash Sales Co., \$10,000; Wisconsin Motor Mfg. Co., \$10,000. Subscriptions to the motor car committee already exceed \$60,000. Rudolph Hokanson, general manager of the Nash Sales Co., has made a personal subscription of \$3,500.

Minneapolis, Minn., Oct. 13—Half a million dollars will be raised by motorists in Minneapolis in the second Liberty Bond sale drive under direction of the Automobile Trade Association. Committees were appointed for each division of the industry, five in all. Besides \$50,000 from the Studebaker branch, \$25,000 from the Pence Automobile Co., \$10,000 from the Wilcox Motor Co. and \$10,000 from the association, several subscriptions of from \$5,000 to \$15,000 have been received.

Boston, Oct. 12—The Boston Automobile Dealers' Association has evolved a plan for a Liberty Loan drive which bids fair to be very successful for the motor industry in Boston and vicinity. The various dealers have agreed to send out every day in the week one or two members of the sales staffs who will do nothing but canvass for Liberty bonds throughout the city. As there are more than 100 dealers in Boston this means that there will be scores of motor salesmen selling bonds every day until the sales close. The men will not try to talk cars, just bonds. They will be given instructions before starting and will work in various sections so that they will not cover territory where others have worked.

Boosters for the Liberty Loan

Industry's Contributions and Campaigns to Help the Nation Win the War

BUFFALO, N. Y., Oct. 12—Charles Clifton, president of the Pierce-Arrow Motor Car Co., states his intention to invest his entire income exclusive of actual living expenses in the second issue of Liberty bonds. Mr. Clifton plans to pay for the bonds on the installment plan after deducting his expenses from his salary and income.

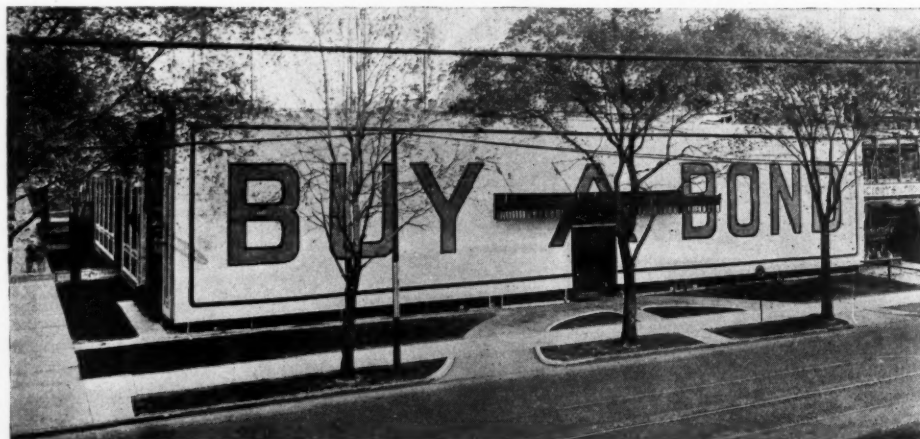
Indianapolis, Ind., Oct. 15—The Studebaker Corp., South Bend, Ind., last week subscribed \$1,000,000 to the second Liberty loan, the largest single contribution that has been made in Indianapolis since the campaign was started.

Chicago, Oct. 16—The motor car trade in Chicago as represented by the Chicago Automobile Trade Association has started a campaign for the second issue of Liberty bonds. During the first day \$100,000 worth of bonds were sold among less than twenty members. The drive started with a mass meeting addressed by Chicago's Four-Minute Men, and opened by the Naval Training Station's marine band. Most of the firms in the association appointed committees in their establishments and it is expected the contributions of the trade will be very large.

New York, Oct. 16—Special telegram—New York dealers have been asked by the Liberty Loan Association to raise \$100,000,000. Whether or not this amount will be raised is conjecture. The advisory trades committee of the Liberty Loan Committee of motor car and allied trades, has been formed. It has been arranged so that the employees will be able to help in the Liberty Loan subscriptions. Each company has been given cards or subscription blanks with punch marks for \$1 a week

payments for bonds of \$50 or \$100 denominations, to be subscribed by the employees.

Milwaukee, Wis., Oct. 15—Milwaukee motor car distributors and dealers have started to raise at least \$100,000 and possibly \$150,000 in subscriptions to the second Liberty loan toward Milwaukee's quota of approximately \$25,000,000. The Milwaukee Automobile Dealers, Inc., head

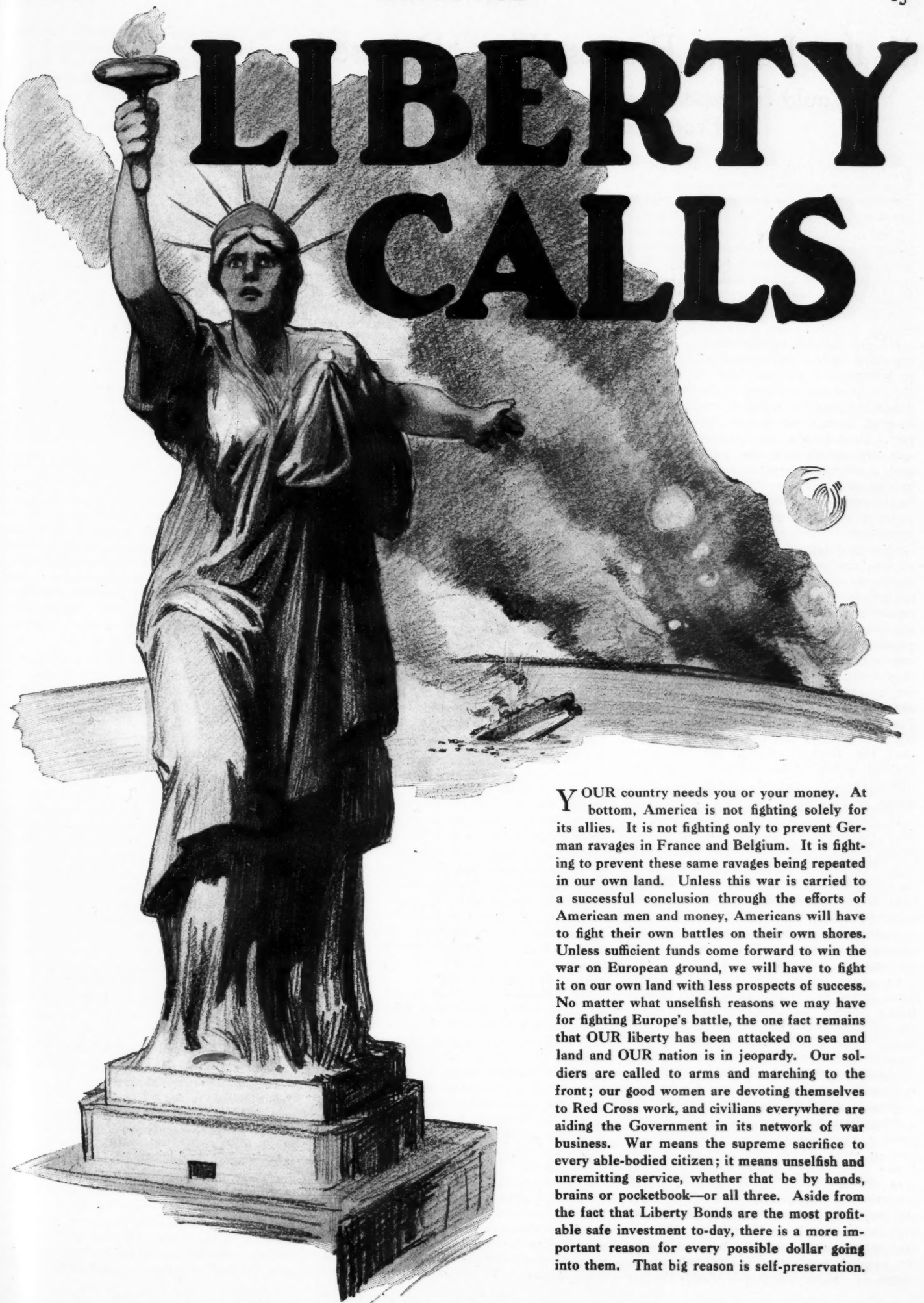


MISSING SALESROOM FOUND BEHIND HUGE "BUY-A-BOND" SIGN

DETROIT, Oct. 10—"They certainly bill this Liberty loan like a circus," said the conductor of a Woodward line car in Detroit as he glanced out at the lithographs on a fence.

"Well, I'm tied up with coal bills and a lot of new furniture," said a passenger who was riding in the rear of the car. "It would have to be a sign as big as a house to jar any bond money out of me just now."

The car had just left Forest avenue going south when he made his statement. "It would, eh?" broke in another passenger. "Well, you just look at that." The car was passing the salesrooms of Thomas J. Doyle, dealer in Dodge Brothers' motor cars. From the roof to the ground, 30 ft., and covering the entire front of the 111-ft. building, was a sign, "BUY A BOND." It was as big as two houses. "You win," said the first passenger. "I'll buy."



YOUR country needs you or your money. At bottom, America is not fighting solely for its allies. It is not fighting only to prevent German ravages in France and Belgium. It is fighting to prevent these same ravages being repeated in our own land. Unless this war is carried to a successful conclusion through the efforts of American men and money, Americans will have to fight their own battles on their own shores. Unless sufficient funds come forward to win the war on European ground, we will have to fight it on our own land with less prospects of success. No matter what unselfish reasons we may have for fighting Europe's battle, the one fact remains that OUR liberty has been attacked on sea and land and OUR nation is in jeopardy. Our soldiers are called to arms and marching to the front; our good women are devoting themselves to Red Cross work, and civilians everywhere are aiding the Government in its network of war business. War means the supreme sacrifice to every able-bodied citizen; it means unselfish and unremitting service, whether that be by hands, brains or pocketbook—or all three. Aside from the fact that Liberty Bonds are the most profitable safe investment to-day, there is a more important reason for every possible dollar going into them. That big reason is self-preservation.

If the Burton Process Were Released

Could Increase Total Amount of Gasoline Produced 75 Per Cent

CHICAGO, Oct. 16—If all the oil refineries in America were to use some redistillation process for the production of gasoline such as the Burton process controlled by the Standard Oil Co. of Indiana, the possible gasoline available would be increased approximately 75 per cent. This is the opinion of a prominent official of one of the independent refiners as given in an interview with a MOTOR AGE representative.

Recent rumors to the effect that the Standard Oil Co. of Indiana might release to independents the privilege of using the Burton process of pressure distillation by which the gasoline yield of crude oil is increased, seem to have some foundation in fact. It is known that government agencies are considering the advisability of such a step and pressure may be brought to bear sufficient to induce the Standard Oil Co. to arrange for some basis of operation under the Burton patents which the independent refiners can accept.

It is understood that the Standard Oil Co. has made tentative proposals to some independent refiners for the use of the Burton process, but in one case, it is said, the royalties were prohibitive and in another the stipulation was made that the independents must not use the process in fields where the Standard Oil Co. is operating, thus limiting the independent market to very small areas. Standard Oil officials here refuse to comment on the situation. The majority of the independents, according to officials of the latter, are so situated that the Burton process can be incorporated in their refineries by a slight addition to their present establishments.

Effect of Release

If the process were released so that all of the refiners would use it, one of two things would happen:

1—The present supply of gasoline would be increased from 75 per cent to 100 per cent without increasing the quantity of crude oil being worked for gasoline.

2—Present gasoline yield could be obtained by working perhaps half the present amount of crude.

In either event, this should lower the price of gasoline or at least prevent it from rising higher. Analysis of the gasoline situation at the present time shows that more crude is being worked than is produced. A more important affect than that of decreasing the price probably would be the conservation of the crude supply.

In ordinary refining without the use of a redistillation process, such as the Burton process, the crude produces about 20 per cent gasoline, 25 per cent of light oil and 5 per cent waste. There remains 50 per cent of fuel oil—a heavy product which contains many molecules of gasoline. With the Burton process this heavy product is broken up so that an additional 20 per cent of gasoline is secured. In other words, the gasoline production is doubled from a gallon of crude. Actually if all the re-

finers were to use the Burton process and if all the crude were to be so treated, it might mean a total increase of gasoline production of about 75 per cent throughout the country.

It must be borne in mind that fuel oil is an important product and particularly in oil-burning engines for marine service, so that it is not logical to expect that all of the fuel oil would be treated for its extra content of gasoline; also, it must be remembered that the amount of gasoline which can be obtained either by the first distillation or by redistillation, varies greatly with the different oil fields from which the crude is obtained.

That there is enough petroleum in the earth to last until the end of the world was the substance of an address made before the Independent Oil Men's Association here last week by Prof. J. A. Haldermann of Chicago.

Making 50 per cent of the product of petroleum bear the burden of marketing the other 50 per cent at a loss was characterized as unsound practice this week by members of the convention. Already, it is said, the Federal Trade Commission recognizes that gasoline should bear the cost of production burden only in proportion to the other by-products of crude oil. It was declared that gasoline now bears 42 per cent of the production cost of crude; fuel oil, 31 per cent; and other products, 27 per cent. A more harmonious distribution of production costs should be made by the Federal Trade Commission, according to the oil men.

The Independents seem to have ground for belief that Standard Oil is going to release the Burton process to all refiners by which a greater production of gasoline from crude is made possible.

The first barrel of gasoline extracted from Venezuelan oil has been presented to General Juan Vicente Gomez by the Carribean Petroleum Co., an American corporation. The company's refinery at San Lorenzo began operation Aug. 16 and is expected to supply a large proportion, if not all, of Venezuela's consumption of gasoline.

The effect this will have on the fuel situation in this country is this. Gasoline and kerosene have been important factors in American trade with Venezuela. While imports of kerosene have remained practically stationary those of gasoline have been increasing rapidly, the figures being: 1913, 700 tons, value \$51,823; 1914, 979 tons, value \$73,433; 1915, 1402 tons, value \$101,604; and for the first half of 1916, 1065 tons, value \$97,493. The San Lorenzo refinery is for Venezuelan trade only, though products of the country's oil fields will be exported from a refinery on the island of Curacao. Not only will this country have the benefit of the amount that would go to Venezuela but some of the new gasoline will be added to this country's imports.

The Inter-Lube Chemical Co. of Delaware has been formed to manufacture a secret compound which is said to add 25 per cent to the efficiency of gasoline when used in an internal combustion engine. It is stated that the French government is using this compound extensively in airplanes, trucks and tractors.

H. J. Mayers, president of the Mutual Motor Stores Co., has been elected president of the new concern, which is capitalized for \$1,000,000 and which takes over the old Inter-Lube Chemical Co. of Cleveland. The company plans to get considerable domestic business soon.

Daniel C. Roper, commissioner of internal revenue, has made a ruling that certain formulas for the denaturation of alcohol to be used as a motor spirit or gasoline substitute, in Hawaii, from refuse material, large quantities of which are going to waste, will not meet with objections from the government. The formula authorized for alcohol to be used for the purpose mentioned, the same to be designated as Formula No. 3, completely denatured alcohol, shall be as follows:

"To each 100 gal. of ethyl alcohol add 5 gal. sulphuric ether, 2 gal. benzine and 1 gal. pyridine."

The ruling was made in response to a request from a San Francisco firm, which stated that a gasoline substitute made from this alcohol had been developed and tested and that it was of great importance to the territory of Hawaii that the vast potential motor power in refuse material be conserved owing to the difficulties of securing gasoline.

Whether it is the plan of those interested in the development of the new process to use it in the United States later, provided authority could be secured, presumably was not stated in the communication to the Commissioner of Internal Revenue.

TRUCK FORMERS COMBINE

Jackson, Mich., Oct. 12—The Redden Motor Truck Co. and the Commercial Car Unit Co., a Philadelphia company which manufactures the Truckston unit for Ford cars, have combined. The new organization has \$1,000,000 capital and combines, it is said, the Cook, Lacoïn and Scott patents. For the present the Redden units will be manufactured in the Jackson plant and the Commercial car units in Philadelphia. In the combination of the two interests Charles F. Redden, president of the Redden company, has sold his holdings and resigned, as announced in MOTOR AGE last week.

U. S. TO REGULATE TRADE

Washington, D. C., Oct. 15—The president has announced the creation of a War Trade Board to take the place of the Export Administrative Board and to be composed of representatives, respectively, of the Secretary of State, the Secretary of War, the Secretary of the Treasury, the Secretary of Agriculture, the Secretary of Commerce, the Food Administrator, and the United States Shipping Board, this board to be vested with authority to issue licenses, or to withhold or refuse licenses, for the exportation of all articles, except coin, bullion or currency, covered by proc-

lamations heretofore or hereafter issued by him under Title VII of the espionage Act.

The Federal Trade commission is given extensive jurisdiction in connection with the issuance or withholding of licenses to corporations organized within the United States or to citizens of the United States to file and prosecute applications in the country of an enemy or ally of an enemy for letters patent or for registration of trade-mark, print, label, or copyright; also, authority to issue or to withhold licenses to any citizen of the United States or corporation organized with the United States with respect to the manufacture of a machine, manufacture, composition of matter, or design, or to carry on or cause to be carried on a process under any patent, or to use any trade-mark, print, label, or copyrighted matter owned or controlled by an enemy or ally of an enemy, at any time during the present war.

KNIGHT AND REPUBLIC COMBINE

Youngstown, Ohio, Oct. 12—The Republic Rubber Co. and the Knight Tire & Rubber Co., Canton, Ohio, have combined as the Republic Rubber Corp. with an authorized capital of \$10,000,000, divided into 100,000 shares with a par value of \$100. Guy E. Norwood heads the new organization. Old stockholders of Republic will receive five shares of new par value common for the old. Old stockholders of Knight will receive two and a tenth shares of new common. All fractional shares will be adjusted on a basis of \$35 a share for the new common.

Production will be increased from 2000 tires a day to 3000 at the new Republic plant here, while the truck tire capacity will be tripled. The output of the Knight plant at Canton will be increased from 600 tires daily to 1000.

TRUCK FORMERS ORGANIZE

Chicago, Oct. 12—Representatives of the tractor attachment makers met here this week and perfected a permanent organization to be known as the National Tractor Attachment Association. J. H. Palmer of the Farm Tractor Co., Fond du Lac, Wis., was elected president; V. P. Wilkins of the Unitractor Co., Chicago, vice-president, and Fred M. Loomis of the Smith Form-A-Tractor Co., Chicago. Just what form the policy of the association will assume has not been determined definitely. The association contemplates a campaign of education to show the farmer how he can use the power he already has with a tractor attachment economically and efficiently.

The next meeting will be held in Chicago the first Monday in November. Those represented at the meeting were: Curtis Form-A-Tractor Co., Chicago; Farm Tractor Co., Fond du Lac, Wis.; Unitractor Co., Chicago; Pullford Co., Quincy, Ill.; Geneva Tractor Co., Geneva, Ohio; 3-P Auto Tractor Co., Davenport, Iowa; Smith Form-A-Tractor Co., Chicago; the Armstrong Bureau of Related Industries, Chicago; the Hyatt Roller Bearing Co., Chicago; together with various farm trade journals. The meeting was called by President Pro Tem L. H. Boydston, who instituted the movement for the association but who is no longer connected with a manufacturer of tractor attachments and, therefore, declined further office.

Patent Pooling Proposition Upheld

Possible Serious Obstacle to Huge Aircraft Program Cleared

CHICAGO, Oct. 15—Attorney General Gregory's holding that the aircraft patent pooling plan to prevent patent litigation does not violate the Sherman anti-trust law clears away a possible serious obstacle to the government's \$640,000,000 aircraft program. The opinion gives legal approval to the agreement between the aircraft production board and the Airplane Manufacturers' Association and ratifies the work done by the board and the advisory committee for aeronautics. It will insure the employment of the entire airplane producing capacity of the country on the program.

The pooling agreement by the Airplane Manufacturers' Association has been explained before in these columns. It pools the basic airplane patents, known as the Wright and Curtiss patents, and all other airplane patents now held or hereafter developed by members of the association, which is open to any builder or patentee on payment of nominal fees.

W. F. Durand, chairman of the National Advisory Committee on Aeronautics, discussing this decision of the Attorney-General, expressed the views that this decision will stamp out litigation, stimulate the aviation industry and clear the way for rapid economic production. Chairman Durand agrees that this decision is of vital importance to the automotive industry and most timely; also, that it is apt to prove of great importance to machinery, electrical and other manufacturing interests. It clears the way, he suggested, for production on a scale necessary to-day in view of the need of aviation apparatus.

Owners of American rights to the manufacture of the British Sunbeam airplane engine have offered them at cost to the government. The offer was made by A. P. Homer of Boston and A. W. Church and George C. Beach of New York. The men will turn over the rights for \$1 each to make the transaction legal. If the government accepts the offer it will have to pay exactly as much as the British government does in royalties. Great Britain is building Sunbeam engines under the license plan. The United States also will have the right to all improvements in the engine developed abroad. The offer is open to investigation thirty days and will continue in force only until the war is ended.

Spruce Lumber Required

The aircraft production board has commandeered airplane spruce lumber on the Pacific coast, and mills with facilities for sawing the spruce must give the government preference. Thousands of women are to be employed in aircraft factories to speed up the work. This will be nothing particularly new for the Navy, as the two big naval clothing factories now are practically run by women.

Dr. W. F. Durand has been re-elected chairman of the national advisory committee for aeronautics. The members of the executive committee are Dr. Joseph S.

Ames, Dr. Charles F. Marvin, Dr. Michael I. Pupin, Major-General George O. Squier, Dr. S. W. Stratton, Rear Admiral D. W. Taylor and Dr. Charles D. Walcott.

A report of the aeronautic show at Milan, at which some twenty captured enemy airplane engines were exhibited, in addition to products of the Italian factories, indicates the six-cylinder vertical engine dominated the display. A brief description is given of a new Austrian engine, the Hiero, believed to be named after the Austrian racing driver and engineer, Hieronymus, who designed it. The engine is built by Warchalowski, Tissler & Co. of Vienna, who also build an airplane engine named after the senior member of the firm.

The output of the Hiero is 215 hp. It has six vertical cylinders, fastened to the crankcase in blocks of three by large wing bolts. A vertical shaft for driving the overhead camshaft, the two magnetos and the pumps passes up between the two cylinder blocks. Each magneto connects to one spark plug in each cylinder so that ignition is two-point. A compression relief is operated by the axially movable camshaft and an inspection window is provided in the crankcase. An expansion chamber of muffler is fitted to the normal exhaust pipes. Another Austrian design, the Ropp, of 165 hp., was represented by two engines. It has two cylinders grouped in pairs and an overhead camshaft of earlier design. The use of semi-elliptic valve springs with six leaves is a feature.

Large Mexican Plant

The Mexican government has built a large airplane factory in Mexico City and will build machines for military and commercial purposes. The government is conducting a school of aeronautics. It is planned to establish aerial mail routes between Mexico City and Puebla Cuernavaca, Guadalajara, Pachuca and Toluca. Besides these airplane routes that will center in the capital, the government has in contemplation similar routes connecting the larger cities of the country with the more remote towns. There are already in practical service two mail airplanes plying between Mexico City and Puebla.

An airplane factory will be located at Sacramento, Cal., at the Globe Iron Works. J. M. Henderson, Jr., and associates have been granted a contract for \$18,000,000 worth of planes to be furnished within the next twelve months, and thirty of the machines are to be delivered before Nov. 1. It is expected 2000 workers will be employed with a monthly payroll of \$160,000. The contract calls for the delivery of five planes a day.

TO MAKE STEWART STARTER

New York, Oct. 12—National City Bank interests have organized a company to acquire the patents of J. K. Stewart, one of the founders of the Stewart-Warner Speedometer Corp. The new concern, known as the Motor Starter Corp., was incorporated

at Albany yesterday with a capitalization of \$2,000,000. It will take over the Stewart plant in Long Island City and will engage in the manufacture of self-starters and other electrical equipment for motor cars. The plant and patents involved have nothing to do with Stewart-Warner.

The directors of the new company are Richard Delafield, Frank A. Vanderlip, president of the National City Bank, and Charles V. Rich and Samuel McRoberts, vice-presidents. Other directors include Sylvester W. Labrot, Charles P. Northrop, Eric P. Swenson, S. M. Swenson and Richard H. Williams.

SHOTWELL IN GOOD SHAPE

Indianapolis, Ind., Sept. 12—The receivership for the Shotwell Pump & Tank Co. has been discharged. The firm is solvent and able to take care of anything it owes and to go ahead with the manufacture of pumps and oil storage systems. The temporary receivership was brought about, according to testimony at the hearing, on account of alleged business differences among the members of the board of directors, but already has been discharged. Insolvency was not alleged.

DORRIS ABSORBS MOGUL TRUCK

St. Louis, Mo., Oct. 13—In the reorganization of the Dorris Motor Truck Co., the Mogul Motor Truck Co. plant is absorbed and George C. Griffith, president of Mogul, becomes a director of Dorris. The reorganization began several months ago when Henry B. Krenning was succeeded by W. R. Coleord as president. M. L. Leathers is now secretary and treasurer instead of Webster Colburn, and Roy A. Gray is wholesale manager. The capital has been increased from \$330,000 to \$1,000,000. G. P. Dorris is vice-president and engineer.

Dealers Hold Open-House Week

ST. LOUIS, Oct. 15—The Open-House week of the St. Louis Automobile Manufacturers' and Dealers' Association was a success as far as arousing interest in the new models and selling of cars was concerned, but it was not a success in the matter of drawing crowds to Row, owing to bad weather.

Secretary R. E. Lee of the association, manager of Open-House week, estimates that the sales averaged more than three to each dealer. In this he did not include the jobbing sales. These were considerable, as several of the local distributors called their dealers in during the week to see the display of winter model cars. Another feature of the week was the number of factory sales managers who came here to look over the display, their first opportunity to see the new models exhibited at one place.

As far as the fraternal features of the week were concerned, they were well carried out. Visitors to the showrooms were not approached until they indicated interest in the cars on display. The professional visitors were well received by those who were displaying competing lines. The visiting was entirely after the dinner hour and all salesrooms were well lighted, taste-

Accessory Space Drawn

Allotments for National Shows at New York and Chicago Are Made

Parry to Have Largest New York Exhibit

NEW YORK, Oct. 12—Ninety-eight accessory concerns have been allotted space at the New York national show, Jan. 5-12, and ninety at Chicago. More than 50,000 sq. ft. of space was applied for this year at both shows. The biggest accessory space at the New York show was taken by the Parry Mfg. Co., which will have 800 sq. ft.

The executive committee of the M. & A. M. held its first meeting on Thursday at Washington, where new members were elected, as follows: Standard Steel Spring Co., Coraopolis, Pa.; Miller Transmission Co., New York; Rand Mfg. Co., Haverhill, Mass.; Phillips-Brinton Co., Kennett Square, Pa.; Rex Mfg. Co., Connersville, Ind.; Warner Lenz Co., Chicago; DuBois Piston Ring Co., Albany, N. Y.

The complete list of accessory exhibitors follows:

New York and Chicago

A-B-C Starter Co., Detroit.
American Bronze Co., Berwyn, Pa.
American Ever Ready Works, Long Island City, L. I.
Anderson Forge & Machine Co., Detroit.
Au-To Compressor Co., Wilmington, Ohio.
Becker Brothers, Chicago.
Benford Mfg. Co., Mt. Vernon, N. Y.
Brown-Lipe-Chapin Co., Syracuse, N. Y.
Brunner Mfg. Co., Utica, N. Y.
Buda Co., Harvey, Ill.
Byrne, Kingston & Co., Kokomo, Ind.
Century-Plainfield Tire Co., Plainfield, N. J.
Champion Ignition Co., Flint, Mich.
Clark Equipment Co., Buchanan, Mich.

Corbin Screw Corp., New Britain, Conn.
Corcoran-Victor Co., Cincinnati, Ohio.
Corning Glass Works, Corning, N. Y.
Cowles & Co., New Haven, Conn.
Dann Products Co., Cleveland, Ohio.
Detroit Pressed Steel Co., Detroit.
Dixon Crucible Co., Jersey City, N. J.
Doehler Die-Casting Co., Brooklyn, N. Y.
Du Bois Piston Ring Co., Albany, N. Y.
E. A. Laboratories, Inc., Brooklyn, N. Y.
Eclipse Machine Co., Elmira, N. Y.
Electric Storage Battery Co., Philadelphia, Pa.
Findeisen & Kropf Mfg. Co., Chicago.
Gabriel Mfg. Co., Cleveland, Ohio.
Gemco Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Gould Storage Battery Co., New York.
Gray & Davis, Inc., Boston, Mass.
Halladay Co., L. P., Philadelphia, Philadelphia, Pa.
Harrison Radiator Corp., Lockport, N. Y.
Hartford, Inc., Edward V., Jersey City, N. J.
Hassler, Robert H., Indianapolis, Ind.
Hayes Mfg. Co., Detroit.
Hayes Wheel Co., Jackson, Mich.
Heinze Co., The John O., Springfield, Ohio.
Heinze Electric Co., Lowell, Mass.
Kellogg Mfg. Co., Rochester, N. Y.
Kent Mfg. Works, Philadelphia, Pa.
Klaxon Co., Newark, N. J.
Lipman Air Appliance Co., Beloit, Wis.
Mann Co., F. W., Milford, Mass.
Merchant & Evans Co., Philadelphia, Pa.
Metal Stamping Co., Long Island City, L. I.
Miller Transmission Co., New York.
Mosler & Co., A. R., Mount Vernon, N. Y.
Moto-Meter Co., Inc., Long Island City, L. I.
National Carbon Co., Cleveland, Ohio.
Parker Rust Proof Co., of America, Detroit.
Parry Mfg. Co., Indianapolis, Ind.
Phillips-Brinton Co., Kennett Square, Pa.
Piel Co., G., Long Island City, L. I.
Rand Mfg. Co., Haverhill, Mass.
Raybestos Co., Bridgeport, Conn.
Rex Mfg. Co., Connersville, Ind.
Rowe Calk Co., Hartford, Conn.
Schradler's Son, Inc., A., Brooklyn, N. Y.
Shakespeare Co., Kalamazoo, Mich.
Shaler Co., C. A., Waupun, Wis.
S. K. F. Ball Bearing Co., Hartford, Wis.
Splitdorf Electrical Co., Newark, N. J.
Standard Welding Co., Division Standard Parts Co., Cleveland, Ohio.
Standard Woven Fabric Co., Walpole, Mass.
Stromberg Motor Devices Co., Chicago.
Superior Lamp Mfg. Co., Inc., New York.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Universal Shock Eliminator, Inc., New York.
Vacuum Oil Co., New York.
Van Sicklen Co., Elgin, Ill.
Veeder Mfg. Co., Hartford, Wis.
Voorhees Rubber Mfg. Co., Jersey City, N. J.
Waltham Watch Co., Waltham, Mass.
Warner Lenz Co., Chicago.
West Side Foundry Co., Troy, N. Y.
Wheeler-Schebler Carburetor Co., Inc., Indianapolis, Ind.
Willard Storage Battery Co., Cleveland, Ohio.
Wilson & Co., Chicago.
Woodworth Mfg. Corp., Niagara Falls, N. Y.

Chicago Show Only

Continental Motors Co., Detroit.
Edison Storage Battery Co., Orange, N. J.
General Electric Co., Schenectady, N. Y.
Imperial Brass Mfg. Co., Chicago.
Oakes Co., Indianapolis, Ind.
Vesta Accumulator Co., Chicago.
Wagner Specialty Co., New York.
Warner Gear Co., Muncie, Ind.
Waukesha Motor Co., Waukesha, Wis.

New York Only

Breeze Carburetor Co., Newark, N. J.
Budd Mfg. Co., Philadelphia, Pa.
English & Mersick Co., New Haven, Conn.
Ericsson Mfg. Co., Buffalo, N. Y.
Hale & Kilburn Co., Philadelphia, Pa.
Hartford Machine Screw Co., Hartford, Conn.
Herz & Co., New York.
Janney-Steinmetz & Co., Philadelphia, Pa.
Light Mfg. & Foundry Co., Pottstown, Pa.
Morse Chain Co., Ithaca, N. Y.
New York Coil Co., New York.
Pantasote Co., New York.
Sparks-Withington Co., Philadelphia, Pa.
Stewart-Warner Speedometer Corp., Chicago.
Syracuse Malleable Iron Works, Syracuse, N. Y.
Wilson Body Co., C. R., Detroit.
Zenith Carburetor Co., Detroit.

SAXON PLANT FOR ORDNANCE

New York, Oct. 12—A meeting between government officials, Saxon Motor Car Corp. officials and other interests was held last week to arrange for taking over the new plant of the Saxon company to manufacture ordnance for the government. Nothing definite was determined at the conference and the matter is still under negotiation.

Boast Not— Achieve

In one of many lofty moods the Airplane
Looked down upon its motor comrade in disdain.
"Your amble 'long the pavement makes me smile,"
Quoth the bird of air; "For your slow-trodden mile
Is multiplied so manyfold by me.
I wonder if you can not plainly see
Your day of doom is surely drawing near.
Read what is writ—the thing you have to fear;
Lift up your eyes; into the future peer.
Your age
Will be a closed page.
In just a little while;
It is useless to revile.
Your fate is sealed; my age but fair begun—
I climb almost to heaven, each day sail higher;
Man's plan it is—his greatest soul desire—
To mount ere long close to the place of Sun;
And you are plodding still the lowly, earthly plane."

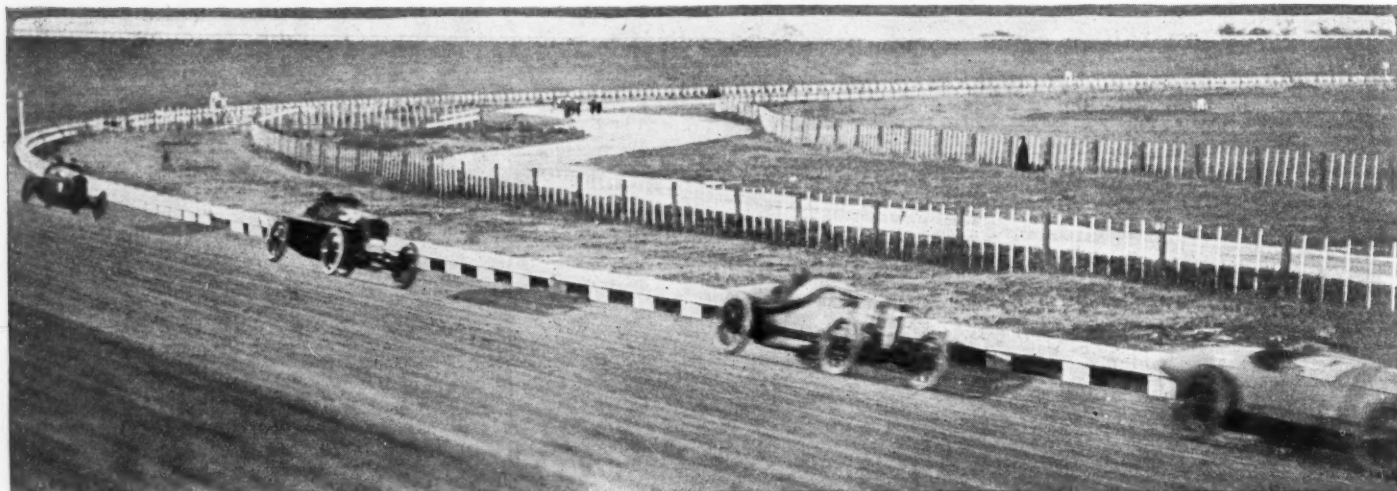
"We make no pretense, make no flaunting boast;
We go our steady way 'mid old Earth's common host.
Of mundane dwellers," quoth the earth-machine,
"And though as yet we do not mad careen
Where you cavort and swing and loop and dip,
We still shall ride in State, the ship
That is charted in the brain of man today—
That eagle-bird of monster build, I say,
That comes—when you have passed away.
Men seem
To think they dream
The marvels out: the things they shape and build;
Seem not to know,
That long ago
The Master willed
And patterned all these things, fulfilled
His promise: man should some time be
Master of all he saw—sky, land and sea.
We shall not boast or effort cease,
There's need for all so-called invented things—
Motor-powered for earth or motor-powered for
wings;
The world will need us all—ere we have peace.
Hands joined to hands and heart to heart—be this
our boast."

—Lady Jane.



Chicago Curtain—Three Victors

Alley, Mulford and Henderson Win Speedway Events Before Record Small Crowd



An odd view made from the top of the track looking down shows Alley leading the field in his Pan-American, with Henderson and Mulford creeping up on him



Pete Henderson, winner of the third event, 50 miles, at 109.62 m. p. h.

A Picture Gallery of the Race Winners Saturday



Tom Alley, winner of the 20-mile race, his first speedway victory



Ralph Mulford, winner of the second event, 50 miles, at 105.96 m. p. h.

CHICAGO SPEEDWAY, Oct. 15—Tom Alley won his first speedway race Saturday afternoon here. Ralph Mulford stepped up from third to first in the second event, winning by inches. Pete Henderson, in a third event, won his first race on the Chicago track, the fastest for the distance ever seen on the Chicago track—all this before a crowd that took more interest in the play-by-play announcement of the fifth world's series game and only came out of congealment at intervals when a Sox runner scored. Close finishes, an accident, and two winners new to the Chicago track furnished the thrills, but the wildest burst of enthusiasm during the afternoon came in the announcement of the fateful seventh inning when the Sox tied the score. Yesterday the speedway management attempted another race as a close to a season that has not been successful, but called it off. It would have required but little of one man's time to have notified each one present individually that there would be no race. Thus the season's close here is

By William K. Gibbs

comparable to ebb tide. Criticism for the fiasco yesterday is laid at the door of the management.

Three events were carded for the Saturday race—20, 50 and 100 miles—but the latter was cut to 50 miles by mutual consent of the drivers and the A. A. A. representative. Of ten entries only eight started in the first event of 20 miles—Joe Boyer's Frontenac and Mason's Ogren being marooned in their respective garages. The starters were: Gil Anderson, Miller Special; Ralph Mulford, Frontenac; Dave Lewis, Hoskins; Gaston Chevrolet, Fronte-

nac; Tom Alley, Pan-American; Tom Milton, Duesenberg; Pete Henderson, Roamer Special; Percy Ford, Delage Special.

Alley took the lead in the first lap, held it for four laps, released it for four more, then took it for two and the finish, winning his first speedway race; time, 11:22.10, speed, 105.6 m.p.h. Ford's Delage died on the first lap, Henderson's Roamer lasted but two, Milton went out at the end of six laps, narrowing the field to five, who finished, with the exception of Gil Anderson, under the proverbial blanket, as follows:

Driver	Time	M.P.H.
Alley	11:22.10	105.56
Chevrolet	11:22.28	105.54
Mulford	11:22.43	105.50
Lewis	11:22.60	105.18
Anderson	11:27.35	104.77

Six faced the starter for the second event—50 miles. These were the finishers in the first event, plus Milton. Fresh from victory in the previous race, Alley began setting the pace from the first, going the first 10 miles in 5:33; average, 103

Times for Three Events at Chicago Speedway

TIMES EVERY TEN LAPS IN 20-MILE RACE—FIRST EVENT

Car and Driver	10 Miles	20 Miles	M.P.H.
Pan-American, Alley.....	5:45	11:22.10	105.56
Frontenac, Chevrolet.....	5:44	11:22.28	105.54
Frontenac, Mulford.....	5:45	11:22.43	105.50
Hoskins Special, Lewis.....	5:46	11:22.60	105.18
Miller Special, Anderson.....	5:48	11:27.35	104.77
Duesenberg, Milton.....	5:50	.....	.....

TIMES EVERY TEN LAPS IN 50-MILE RACE—SECOND EVENT

Car and Driver	10 Miles	20 Miles	30 Miles	40 Miles	50 Miles	M.P.H.
Frontenac, Mulford.....	5:50	11:24	17:01	22:41	28:18.75	105.96
Miller Special, Anderson.....	5:54	11:23	17:02	22:41	28:18.90	105.95
Pan-American, Alley.....	5:33	11:22	16:60	22:39	28:18.95	105.94
Duesenberg, Milton.....	5:50	11:23	17:00	22:40	28:19.20	105.93
Hoskins Special, Lewis.....	5:53	11:24	17:00	22:40	28:19.25	105.92
Frontenac, Chevrolet.....	5:50	11:22	17:00	22:40	.....	.....

TIMES EVERY TEN LAPS IN 50-MILE RACE—THIRD EVENT

Car and Driver	10 Miles	20 Miles	30 Miles	40 Miles	50 Miles	M.P.H.
Roamer Special, Henderson..	5:44	11:24	17:05	22:49	27:22.21	109.62
Frontenac, Mulford.....	5:55	11:24	17:05	22:52	27:27.27	109.32
Pan-American, Alley.....	5:43	11:25	17:05	.....	.....	.....
Duesenberg, Milton.....	5:44	11:24	17:05	.....	.....	.....

*Hoskins Special, Lewis.....
*Accident in eighteenth lap; 47.7 and out.

m.p.h., the second in 11:22, average, 105.5, the third in 16:60, average, 106.8, the fourth in 22:39, average, 106. Only once, at the end of 16 miles, did he give up the lead. Then Chevrolet nosed him out at the tape, but dropped back. The last lap of the event was the surprise. Even with the last lap half over Alley looked like a consistent winner, but as the field came into the turn from the back stretch so closely bunched that a field glass in the judges stand revealed them all in its scope without shifting, Ralph Mulford, who was third, and Gil Anderson, who was fifth, were seen to creep to the front. Alley was still in the lead as they came out of the turn into the homestretch, but in that short space Mulford and Anderson passed him. Thus third and fifth at the beginning of the last lap finished first and second. One flick of the checkered flag and the entire field had passed Fred Wagner and the race was over. One-half second between first and fifth! Never has Chicago seen such a finish but applause was lacking. Here is how they finished:

Driver	Time	M.P.H.
Mulford	28:18.75	105.96
Anderson	28:18.90	105.95
Alley	28:18.95	105.94
Lewis	28:19.20	105.93
Milton	28:19.25	105.92

Gaston Chevrolet went out at the end of 44 miles when his Frontenac broke a connecting rod.

Last Event Cut

The last event was scheduled for 100 miles but by mutual consent of the drivers and the contest board representative it was cut to 50. Pete Henderson got a new rocker arm fitted to his Roamer Special in time to start in this event, the five finishers in the previous event and Henderson making up a field of six. Anderson went out at the end of 10 miles and Lewis at 18 miles. Tom Alley, as in the two previous events, took the lead at the start, but at 16 miles Pete Henderson assumed the role of leader. Tom Milton was second, Alley went down to third with Mulford fourth. At 10 miles Alley's time was 5:44 and his average 105. At 20 miles Henderson's time was 11:24, an average of 105.3. From

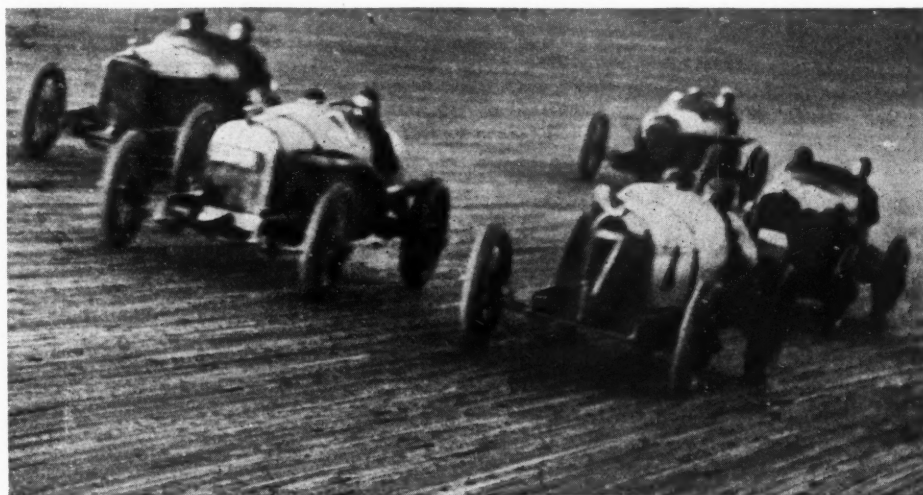
the twentieth mile there were but four in the race—Henderson leading, Mulford sec-

ond, Milton third and Alley fourth. At 30 miles Henderson had increased his speed to 106 m.p.h. The quartet went into the eighteenth lap closely bunched. Difficulties arose at the first turn. Milton grazed the tail of Mulford's Frontenac, his car swerved and Alley crashed into Milton's Duesenberg. The heavy safety rail gave way before the double onslaught and the Duesenberg and Pan-American locked arms, did the Highland fling and settled down about 200 ft. farther into the turn, facing the opposite direction and with drivers and mechanics in their seats, shaken but unscathed. This eliminated all but Henderson and Mulford, the former finishing in 27:22.21, while Mulford's time was 27:27.27, their speeds being 109.62 and 109.32, respectively.

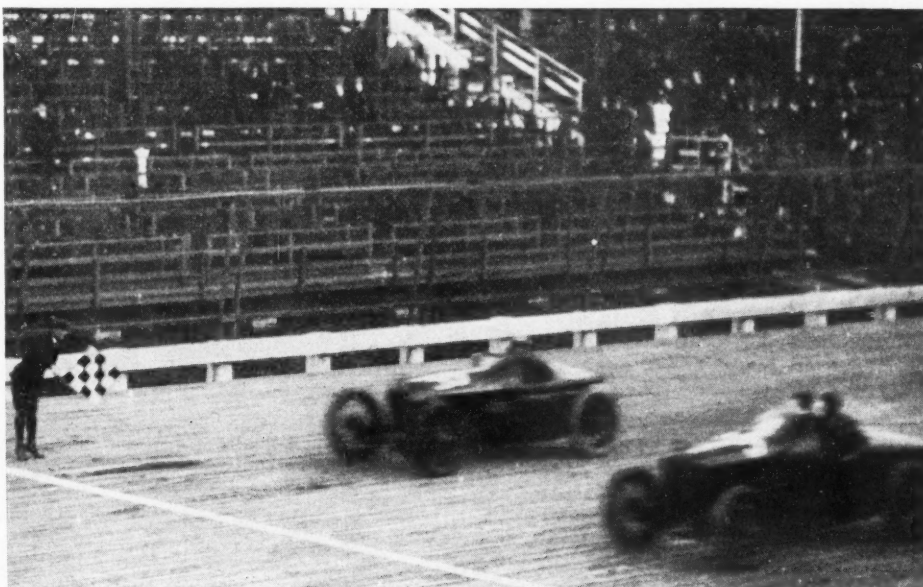
Sunday Races Fizzled

Sprint races advertised for Sunday afternoon as a postscript to those of Saturday fizzled. There were but four drivers to start and only a handful of people to witness the event. It was not sufficiently advertised and the announcement was not made specifically clear to what there was of the crowd Saturday.

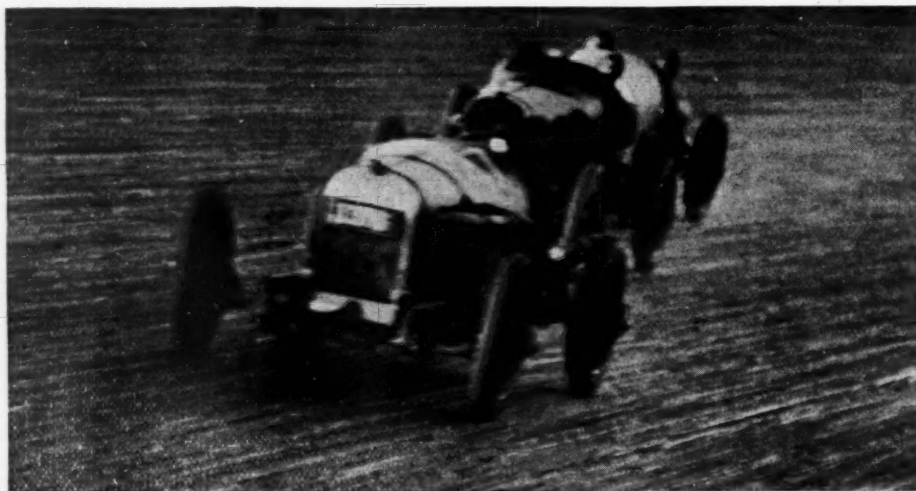
Plans for distributing the prize money



A brush in which five contended, with Alley slightly in advance



Starter Wagner giving Mulford the flag for the finish of the 50-mile, with Anderson a close second



Alley, Mulford and Henderson in a close tilt on the home stretch with Alley leading by several feet

in Saturday's races on the point system was abandoned, there being nothing to divide. As has been the custom at recent races on the Chicago track with the exception of the first race this year, 40 per cent of the gate was to go to the drivers, after each had received \$300 guarantee for starting. The gate is said to have been about \$1,500, so it is difficult to see how there would be any to divide.

The future of the Chicago track is problematical. Principal owners of the course are said to have been negotiating with several men experienced in such matters with a view to appointing a new directing head. Dissatisfaction has been cumulative and it is thought to have been the supreme blunder to stage a race on the day of the world's series ball game and trying to follow it with a contest for which virtually no preparations were made. It seems likely that Saturday and Sunday marks the final curtain on racing here until after the war.

One of the things brought out in the race was that cold weather and race car engines have no affinity for one another. Good carburetion was difficult and this, coupled with the fact that lubricating oil did not thin out sufficiently in some instances to function properly, slowed up the cars. Henderson in the Roamer, equipped with a Duesenberg engine, spent practically all of the duration of the first and second race in filing down the valve stems of his mount. Several of them had become stuck in their guides, apparently from lack of lubrication. Ordinarily the stems are lubricated by oil in the form of a mist thrown up from the crankcase on the inside of the valve

cover plate. Evidently the mist was not forthcoming due to the chilly atmosphere. Henderson was the first driver to stop at the pits. Before this Boyer had already eliminated himself by breaking the crankshaft of his Frontenac. The Delage was pushed off the course early in the first race with a broken valve. The old offenders, tires and plugs, did not manifest themselves often. In fact, there was no tire trouble, although some of the drivers changed shoes between races merely as a precautionary measure. Milton made a stop at the pits for a change of plugs. Anderson's Miller Special followed closely the construction of Oldfield's Golden Egg, also a Miller creation. Anderson's car was fitted with a double steering linkage, so that if one side gave way the other would still hold. The car has cantilever springs in the rear and semi-elliptic in front. All the bugs have not been taken out of the engine as yet, but the menacing roar of its exhaust speaks well of the car's future in racing circles.

AMERICAN AMBULANCES ABROAD

Washington, Oct. 12—So great is the congestion of railroads in France, large quantities of Red Cross supplies are being transported by motor truck from seaports to Paris and other distribution centers. Drivers are being organized in crews and will be handled on a military basis as a part of the Red Cross Transportation Service under Major James H. Perkins. Eleven experienced American motor truck drivers sailed recently for France to serve in the Red Cross transport division. Sixty-one more men are being trained by the Red Cross in motor car factories at Cleveland,

Detroit and Buffalo and are to sail soon.

Many of the motor truck drivers now in France originally signed up for work as ambulance drivers, but the congestion of railroads made it more imperative that they drive trucks, and scores of university and college students are serving under fire while bringing up supplies over exposed highways.

The first new group of ambulances donated by Americans to Russia soon will be in active service. They are to be used in connection with the American mission to Rumania within two weeks, it is said. Miss Margaret Wilson, daughter of the President, has earned enough from her singing to equip six ambulances for the American Red Cross in Russia, besides donations to other relief funds, and these are expected to relieve to a large extent the deplorable conditions which led to the request of ambulances for Russia.

Three ambulances and one kitchen trailer have been given to the Red Cross by the employees in the Department of Agriculture. The campaign to raise funds for these gifts resulted in subscriptions amounting to nearly \$4,000, \$1,137.36 being collected in one bureau alone.

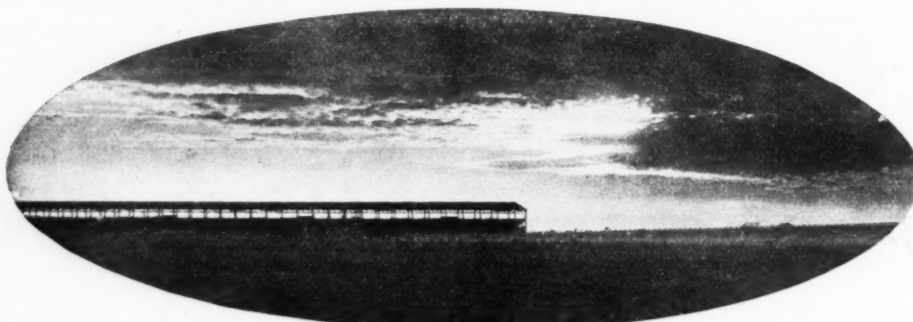
MILITARY ROADS A PROSPECT

Chicago, Oct. 12—A continuous paved military road from Chicago to Rockford and Camp Grant, which MOTOR AGE has been advocating as necessary to the military organization, is becoming more probable. The supervisors of Boone and McHenry counties will consider ways and means of providing their share of the road construction at a meeting some time this month. Should these two counties approve the road, the highway will be practically assured. Cook County is paving its part, and Winnebago County will vote Oct. 20 on a bond issue for building 6½ miles of the road from Rockford to the Boone County line.

The Chicago-Rockford road plan has been extended to include connecting roads from Rockford to Fort Sheridan and the Great Lakes Naval Training Station, all of which have been urged by MOTOR AGE as necessary for the most efficient transportation.

CANADIAN LIBERTY IS FORMED

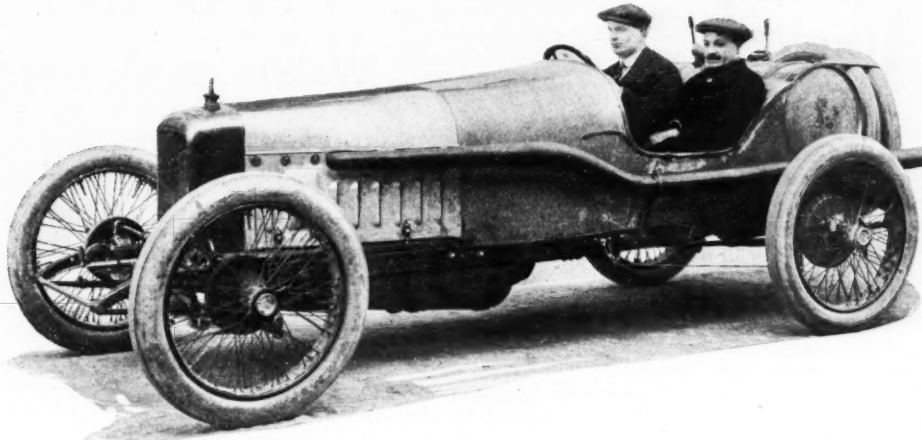
Detroit, Oct. 15—The Liberty Motor Car Co. of Detroit, has incorporated under the Canadian laws as the Liberty Motor Car Co. of Canada, Ltd., of Windsor, Ont. The incorporators are: Percy Owen, president; J. F. Bourquin and Harland M. Worth, and the capitalization is \$10,000. The new incorporation has been made to protect the name of the company in Canada, and to insure facilities for Canadian business.



Sunset on the Chicago speedway

The Fiats That Stayed at Home

How the Two Italian Cars Built for American Racing Speedways Are Built



One of the Fiats that American speedways were to see this season

TURIN, Italy, Sept. 24—When the Indianapolis speedway company decided it would abandon racing for the war the Fiat Co., Turin, Italy, had two racing cars packed, loaded in the freight cars and on their way to America via Genoa. With the Indianapolis race off, the Fiat directors decided they, too, would wait until the fighting was over before appearing on a race track. In consequence the cars were recalled to the factory, where they now remain. An opportunity recently has been given of examining these machines. Although based on the racing cars which ran in the last French Grand Prix at Lyons, the American track racers are special models. The engines have four cylinders of 300 cu. in. piston displacement, the cylinders being steel with welded-on jackets and having four valves-in-the-head operated by an overhead camshaft. It will be remembered that in the French Grand Prix the cylinders were cast and a single pair of valves was used.

Important changes have been made in the general balance of the cars, with the result that they now hold the road in a remarkably good manner. All speed tests have had to be made on the open road under every day conditions; despite these

disadvantages, the cars have shown more than 112 m.p.h., electrically timed. With such a speed it is safe to assume that the cars would have been fast enough on the tracks to get a high position among the money.

Drivers selected for the Fiat racers were Jack Scales, an Englishman who has had a long connection with the Fiat Co. at Turin, and Tony Fagnano, whose racing experience dates back to the very early days, for he rode as mechanic with both Lancia and Nazzaro, when those two men were record breakers for Fiat. Fagnano and Scales are employed on special war work at the Fiat factory. Although disappointed that the war has made it impossible for them to race this year, they hope to be in the game when the guns have ceased firing.

PRICES SOAR IN FRANCE

Chicago, Oct. 12—Prices for motor vehicles in France are steadily going higher, though they already are almost beyond belief, according to a cable to the *Daily News*. Prohibition of imports and purchases by the United States army and the Red Cross have had a strong effect on the second hand car market, few new cars being available now. A used Rolls-Royce

brings 75,000 francs, \$15,000, and a used new model Ford 7000 francs, \$1,400.

The United States army offered 39,000 francs, \$7,800, for a nearly new Bancia, which was held at 45,000 francs, or \$9,000. A 1915 10-hp. Panhard brings from 18,000 to 20,000 francs, \$3,600 to \$4,000; a Renault 10-hp., 17,000 francs, \$3,400; a two-year-old Dodge Brothers car, 11,000 francs, \$2,200; and a 12-hp. Delage from 14,000 to 16,000 francs, \$2,800 to \$3,000.

All French motor car makers are under military control, and spare parts are hard to obtain. Italian cars, like all others, suffer from the prohibition of imports of spare parts and accessories. The result is a scarcity of cars and the institution of gasoline cards. An abundance of gasoline is available for the military authorities and individuals. Wholesale dealers sometimes find it hard to obtain storage room for their stock. Nevertheless, the price was increased slightly Oct. 1, the minimum in Paris being 5 francs, 75 centimes, \$1.15, for 5 liters, 5 qts.

TWIN CITIES TEST MOTORISTS

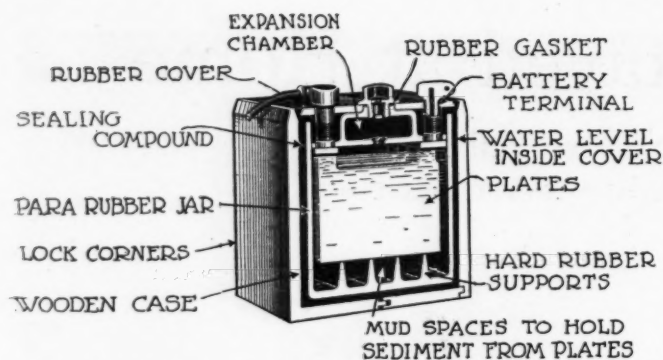
Minneapolis, Minn., Oct. 13—The usefulness of the Minnesota Motor Reserve Minneapolis corps was tested in a strike of Twin-City Rapid Transit Co. trainmen. Oct. 7 call was made by the sheriff of Hennepin county for ten cars. The cars were at the courthouse in 20 min. A run was made to St. Paul to stop rioting. One car made the trip to the St. Paul armory, more than 10 miles, in 16 min. Each night for four days from forty to 180 deputies and home guards were taken to St. Paul. In Minneapolis deputies and reserves were sufficient to prevent rioting.

FRANKLIN REACHES 52 DAILY

Syracuse, N. Y., Oct. 12—The week ending Sept. 29 smashed all production records for the Franklin Automobile Co. During the week 285 cars were turned out in five and a half working days, an average of fifty-two cars a day. In spite of increased output orders have been gaining steadily on shipments.



One of the huge cigar-shaped balloons about to soar into the air on the grounds of one of the Army training schools "somewhere in the United States." Here many of our future observers are being trained for service



There is more danger of discharging the battery in winter than in summer; hence, you should know how to take care of it properly

COLD weather cuts down the efficiency of the electric starting and lighting system, especially the battery. In winter most owners drive in the city where the streets are congested, driving is slow and many stops are made. Lights are used much more in winter than in summer, for the days are short and the nights long, quite the reverse of summer conditions. The trouble in winter driving is that there is not the same opportunity to get car speed enough to do as much charging as in summer. It is up to each owner to see that the electrical energy in the storage battery is conserved. It is foolish for one to press the starting button and hold it down for 2 or 3 min. with the engine so cold that gasoline cannot get into the tops of the cylinders. When you hold the starter button down for 2 or 3 min. before the engine starts, you take from the battery energy enough requiring an hour or more driving of the car with the lights off, before the battery will again be in the shape it was before the engine was started. Those who prefer to hold down the starter pedal 3 or 4 min. instead of priming the engine will sooner or later come to grief, for no battery will stand up under such punishment.

Discharging Battery

There is more danger of discharging the battery in winter than in summer. To take a specific case: Suppose a man drives his car to work every day. He lives, we will say, 4 or 5 miles from his office. If he allows the starter motor to turn over for 2 min. before the engine starts in the morning, he has taken enough current from the battery to necessitate the car being driven about 15 or 16 m.p.h. for 35 min. to replace the charge. Normally he will drive to the office in about 25 min. He uses his lights going home, consuming about half the charging current. The same thing takes place the next and succeeding days and each day the battery is being sapped of its life. Finally it goes dead and the owner wonders why. Never use the starter motor for more than half a minute. Provide some means for easy starting; prime the cylinders; choke the carbureter; heat the manifold, do something so the engine will start in half a minute or so.

Putting the electrical system in shape for the winter means scrutinizing the wiring for short-circuits, replacing with lamps of smaller voltage, smoothing commutator and brushes of generator, and, finally, keeping the battery from freezing and in a charged state. Go after the wiring first and check up on the following things:

1—Go over every inch of wire from the headlights, sidelights, and tail lamp to the lighting switch and examine for weak spots or grounds. This is not so necessary where armored lighting cable is used.

2—Replace oil-soaked wires under the hood with new ones.

3—Examine the connections at the lamp terminals or sockets. Sometimes little stray ends of wire cause trouble inside the connectors by partly short-circuiting.

4—Wherever you tap a wire solder the connection and tape it, but do not use acid for flux. It may corrode the joint and result in poor contact.

5—See that all connections on the ammeter, generator, fuse block cut-out, etc., are tight. The storage battery terminals after being screwed down tightly should be coated with vaseline to prevent corrosion.

6—If the hand of the ammeter does not come to absolute zero when the engine is not running, there may be a ground somewhere in the system. Test for it by disconnecting wire at one of the battery terminals. Should the hand come to absolute zero, there is a ground. It may be that the hand of the instrument is bent slightly and does not come to zero when at rest; in this case make allowance.

7—If the insulation is worn on a wire wrap it with tape. On a two-wire system if one wire is grounded no harm is done, as shown by A in Fig. 1. But if there is a ground in the other wire at any point as at B, a short-circuit will exist and the lights will be out. The danger of such a short is that the car may be put away for

a day or so with both wires in contact with the frame or other metal part of the car and when the owner comes to take the car out again, the battery will be exhausted.

8—Replace bulbs that have been in the lamps for more than two or three months. Tungsten lights burn brightest when new, but a week's running with the lights on for any length of time decreases their efficiency at a surprising rate, so that after a few weeks use, they will be drawing more current than they should.

If the taillight and dimmer bulbs are of 4 volts each, replace them with 2-volt bulbs for the winter. You can also drive without the dash light very often. If it is wired in series with the taillight take out the bulb and wire around it. Any current you can save in this way means just so much less work for the battery. Spotlights are handy, but they consume current, so drive with the headlights only if you can.

9—When you stop for any length of time at night, run the car into a driveway, if possible, and leave only the taillight burning.

Generator and Motor

The generator and starting motor must come in for their share of attention, especially the former. In most cases battery starvation can be prevented by paying proper attention to the generator commutator and brushes. A clean dry commutator and well-fitting brushes are necessary for winter operation. Being fitted with carbon brushes, the generator commutator has a tendency to become dirty.

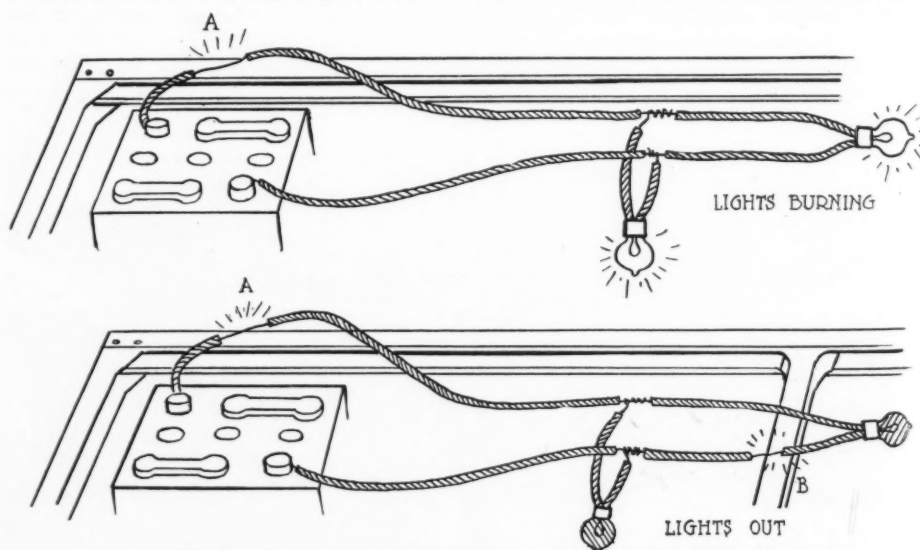


Fig. 1—One wire grounded does not make a short-circuit on a two-wire system, A, but both wires grounded do, B

No such trouble is experienced with the starting motor and about all the owner has to do to get it in shape for winter is to see that it is oiled occasionally and that the bolts holding it to the supporting bracket are tight.

To get the generator into shape three things are necessary, providing the car has been used for some time. The commutator must be made smooth, new brushes put in and the high mica removed. Here is how to go after the commutator:

1—First of all, never put oil on the commutator. If it appears dirty clean it with a little kerosene on a cloth and wipe it dry with a clean cloth.

2—A commutator in good condition has a smooth, glossy surface, usually of a purplish color. If it looks dull and rough, smooth it by passing a strip of sandpaper the width of the commutator under the brushes. Pull the ends of the sandpaper back and forth until the commutator takes on a smooth finish all the way round.

3—Do not hold the paper on the commutator with the finger or piece of wood; it will cause an uneven surface and poor-fitting brushes.

Clean and Polish

4—After sandpapering the commutator, remove all grit and dust, taking special pains to clean between the copper segments. Finally polish with cheesecloth and a little oil. Use No. 0 or 00 sandpaper. Never use emery in powdered form or emery cloth near a generator.

High mica is a condition existing when the copper segments of the commutator have worn down so that the mica is left slightly raised. The result is that brushes ride principally on the mica, making poor contact with the copper segments and very little current is generated. This may be remedied as follows:

1—Remove the generator from the engine and take out the armature. Place it between the centers of a lathe and true up the commutator, being careful to take only

a light cut. This is to prevent too much copper being wasted. The idea is to get the mica down on a level with the copper segments.

2—With a three-cornered file notch all the micas between the segments as shown at A in Fig. 2.

3—Take an old hacksaw blade and break it so one end slants toward the teeth. Fit a handle in the other end and then undercut the mica with the saw as shown at B. The depth of the cut should be about $1/32$ in. Preferably the hacksaw blade should be about .003 thicker than the mica. If necessary the blade can be ground to the required thickness.

4—With a strip of smooth sandpaper remove any burrs and polish the commutator with cheesecloth and oil. This can be done in the lathe, revolving the armature at a high rate of speed.

5—The illustrations to the right of A and B in Fig. 2 show incorrect and correct conditions of the mica. Note that in the correct condition there is no mica clinging to the sides of the undercut.

The lower row of illustrations in Fig. 2 show incorrect and correct ways of fitting commutator brushes. To fit brushes properly use a strip of sandpaper as before, but in this case turn the sanded side next to the brush. Let the brush rest on the paper with its normal spring tension. Pull the strip back and forth with the ends held close together. See that the paper is wide enough; it should be a little wider than the brushes. This will insure good contact for the entire cross-section of the brush.

Clean the commutator frequently after this every two or three days until the brushes take on a smooth finish.

Your storage battery will have to be kept fully charged or nearly so during the winter months to prevent freezing of the electrolyte. Once a battery has been frozen it is ruined, because the liquid expands in freezing, breaking the plates, jars and other vital parts. Never allow the battery to become less than half charged; therefore

in cold weather it is advisable to take gravity readings every day. The hydrometer is invaluable in ascertaining the condition of the electrical system. The following table shows at what temperature the electrolyte freezes at different gravity readings:

Specific Gravity	Amount of Charge	Freezes at
1.280	Full	98 below zero
1.260	$3/4$	60 below zero
1.225	$1/2$	38 below zero
1.160	$1/4$	Zero
1.150	Empty	13 above zero

Internal repairs to the storage battery are beyond the car owner, therefore it would be well before cold weather sets in to turn the battery over to a service station or a competent electrical man for inspection. If the battery is partly run down have it charged fully from an outside source and then endeavor to keep it near this point.

Add Only Water

Add nothing but pure water to the battery cells and do it often enough to keep the plates covered with the solution. Keep the cell covers and connections clean and free from dirt or moisture. Also see that the battery is fastened firmly in place in its carrier. One of the best guaranties you can have regarding the maximum efficiency and life of the battery is to make sure the generator is kept in good condition. When you take out the battery for any reason, never run the engine so that the generator will operate. Serious damage may result. In some instances this can be overcome by bridging the generator terminals when the battery is disconnected.

So far as adjusting ignition relays, cut-out relays, adjustment of charging rates, etc., are concerned, these are subjects for experienced persons and had better not be attempted by the private owner with the facilities of an average private garage. There is such a variety of systems, that one method will not fit all. Besides special tools and equipment are necessary sometimes to make the change and these the car owner generally has not.

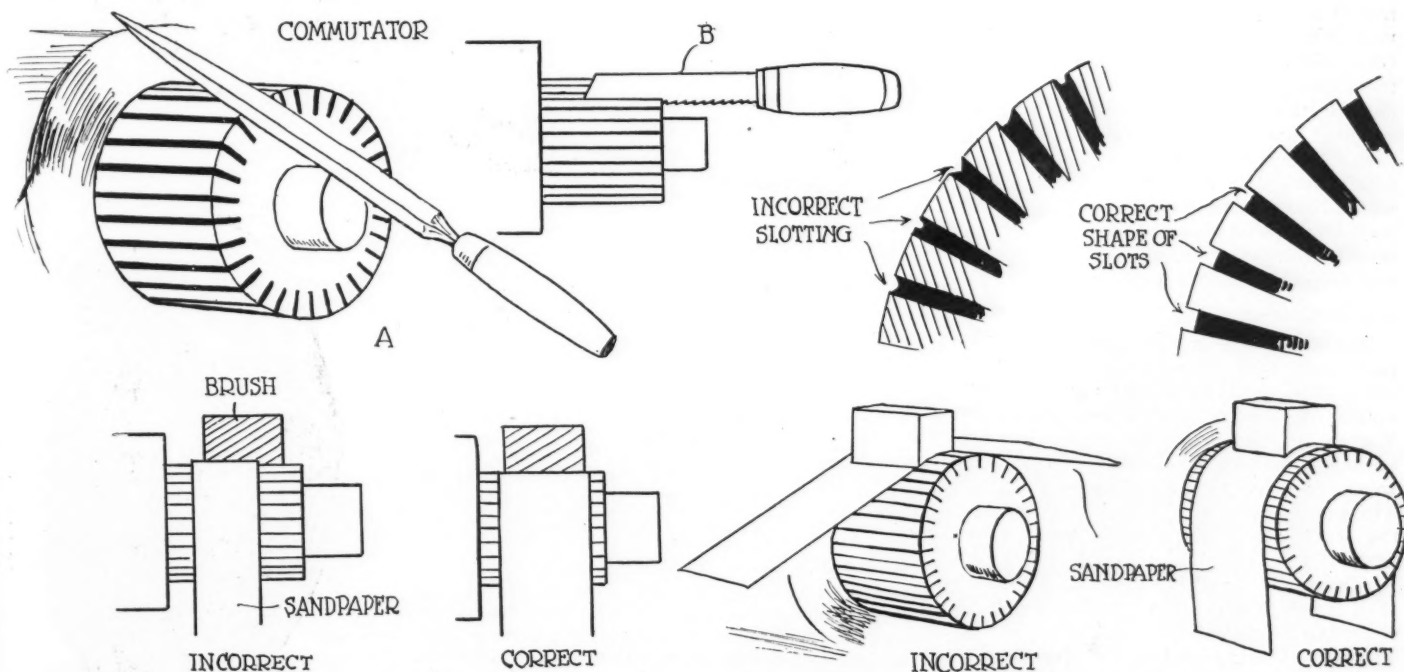


Fig. 2—How to notch the micas between the segments, A and B; correct and incorrect conditions of mica, upper right; correct and incorrect ways of fitting commutator brushes, below



Taking Bad Roads Out of Wayne County

DETROIT, Oct. 11—Detroit, the motor city of the world—has always been surrounded by mud. But to-day marks the date that good roads have pulled it out of the mud and placed it in a position equal to, if not better than, any other city in the United States. To-day marks the completion of the Northville outer-belt drive, a part of the Wayne county concrete system which, taken with the mileage inside the city limits, presents a continuous paved highway 120 miles in length. Intersecting with all radial roads, it brings the remotest corners of the county into close contact with the city. In honor of this achievement, the Detroit Automobile Club turned out en masse, dedicated the road and celebrated its opening to the motorist.

Approximately 700 cars paraded to the end of Seven-Mile road. The parade contained all sorts of cars. Henry Ford took twenty-five cars from the factory, provided them with drivers and carried the out-of-town guests. The dealers were an essential part of the good roads boosting tour and supplied almost 200 cars for the same purpose. The amalgamated band—containing in all more than 250 pieces—was largely a motor organization. Ford, Willys-Overland, Reo, Studebaker and Packard each sent their factory band—and these united and helped boost the good roads.

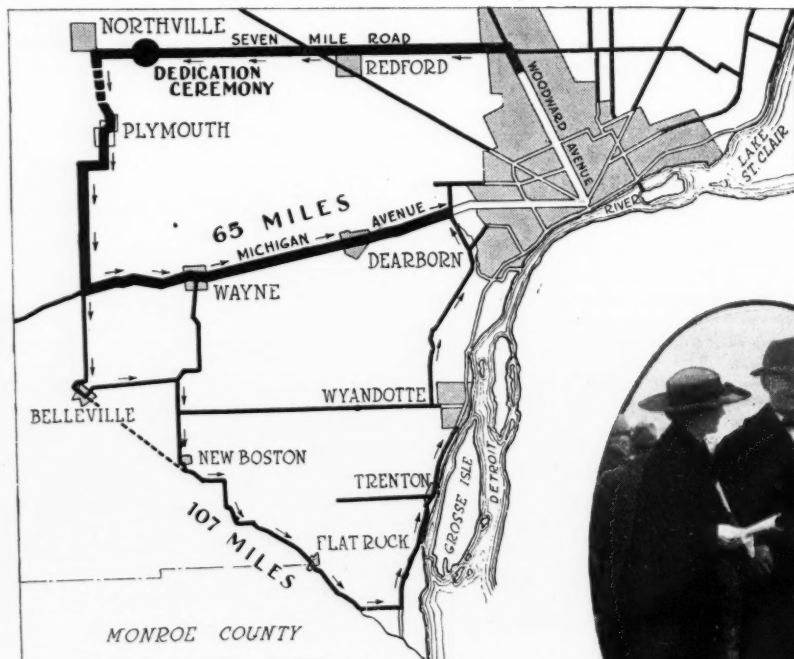
The Dedication

The dedication ceremony was in three parts and took place at the end of the Seven-Mile road. The first part was symbolic of cutting the bad roads out of Wayne county. A banner barrier was stretched across the road, bearing the words "Wayne—Bad Roads—County." Alexander Groesbeck, attorney general of the state, and William E. Metzger, president of the Detroit Automobile Club, cut the barrier. Attorney-General Grossbeck then formally opened the road to traffic by removing from the road the last remnant of earth covering—using the historic gold and silver shovel that always is used in Michigan for this purpose. Then followed the christening of the road—"The North-

With one fell swoop, Attorney-General Groesbeck and President Metzger cut the "Bad Roads" out of Wayne county and Seven-Mile road was open



Every bend permitted the motorist to look back or ahead along the line. This shows the character of the country on road near Detroit



Above, a portion of the good roads Wayne county has constructed. It was the Seven-Mile road that was dedicated on good roads day. After the ceremonies, the motorists returned to Detroit on the road that is shown in the heavy black line. Right, H. M. Rowe, president of the A. A. A., and his daughter at the dedication



ville Outer Belt Drive"—by breaking a bottle of champagne on the road surface. The amalgamated motor band then played "The Star Spangled Banner," after which the motorists proceeded to the Northville fairgrounds, where the luncheon and dedication speeches took place.

The day was also "Northville-on-the-map day"—for the road removes Northville from its isolation, so the citizens turned out in a body, fed the crowd and added another band to the regiment already present.

Not only was the day a Detroit day, a Wayne county day, a Michigan day; it was also a National day. Already 5000 miles of state highway are either completed, or under contract. These connect, or will connect all important cities of the state by trunk lines and will connect with trunk lines to all important cities of neighboring states. It has been estimated that by the construction of permanent roads from Detroit to the seacoast 10,000 freight cars would be released, if cars and trucks could leave under their own power. And the present road is an important link in this road system.

Value of Road Work

To those communities that are considering the value of road improvement, the following figures on the value of the Seven-Mile road are pertinent. In 35 miles of the road just completed, 44,800 acres of land lie within a mile of the road. Due to the road alone, the increase in value of this land per acre will be \$25. This is a total value increase of \$1,120,000—and the road cost \$875,000. Hence, the land profit alone derived from the road is \$245,000. And the farmers paid but 7 cents of each dollar on the cost of the road.

No motorist visiting Detroit should fail to take the trip over the route of the dedication parade. From Woodward avenue, the Seven-Mile road extends to Northville through a level farming community. Northville is purely a residence village—a bit of New England transplanted to the Middle West. From Northville, the return road goes south through Plymouth and then bears to the left to Wayne. Here the motorist can return direct to Detroit on the Chicago road or can bear south through the Wayne road, over the Huron River drive and then north along the Detroit River road to Detroit. The shorter route is about

65 miles, and the longer route, 107 miles. All of it is over the best possible roads, the larger part of which is of permanent concrete construction.

The good roads in Wayne County are the result of co-operation. Co-operation between the board of county road commissioners, the chamber of commerce, and the Detroit Automobile Club. In the evening, the Detroit club gave a dinner for its guests. About 200 were present, including important road men from Wisconsin, Pennsylvania, Ohio, Illinois and Indiana.

FIVE NEW INDIANA ROADS

Indianapolis, Ind., Oct. 15—Five highways across Indiana have been organized recently. The new roads will be marked and permanently improved, it is expected as a result. The first extends from Cincinnati by Richmond and Fort Wayne to Kalamazoo. It will be known as the O. I. M. way and will be marked by a 14-in. white band flanked top and bottom with a 2-in. black band with the letters in black.

The second is the Hoosier highway, from Bryan, Ohio, to Fort Wayne, Bluffton, Montpelier, Hartford City and Muncie and will have a marker with a red H on white. The third will go from Lafayette to Frankfort, Tipton, Alexandria, Muncie, Winchester, Union City, Ind., and Greenville, Ohio. Its marker will be a hub in black on a white band between black bands.

The Belt line will run from Lafayette to Columbus, Ohio, by Kokomo, Marion, Hartford City and Marysville. The marking will be a black B on white between black bands. The fifth is the Terre Haute, Columbus and Cincinnati trail, marked T.C.C. in white on black. The highway organizations are the result of several months of work by the Hoosier State Automobile Association.

NATIONAL USED CAR SHOW

Detroit, Oct. 15—The Packard Motor Car Co. is holding a national used car sale this week. The sale is staged by all Packard dealers at the same time, thus giving every dealer an opportunity to get the most out of the publicity and advertising.

Not only is the Packard company suggesting that the dealers hold the used car show, it is showing exactly how the show should be staged. A sixteen-page prospectus has been sent to each dealer, giving

a complete outline of the method. Specimen lay-outs of full-page newspaper advertisements are given, together with a schedule in which the advertising should appear. The banners to be used are illustrated definitely, as are the cards for street cars and the bulletins describing the used cars.

TO BREAK DIXIE BARRIER

Louisville, Ky., Oct. 13—Ninety per cent of the difficult construction of the Dixie highway between Knoxville and Chattanooga, Tenn., is completed, and the opening of the Cumberland mountain barrier is all that stands in the way of a completed highway between Cincinnati and Chattanooga. Direct travel from north to south will be made possible by the end of the year by the raising of a subscription fund of \$50,000. This amount, added to an equal amount set aside by Kentucky from its quota of Federal aid, will open the 7-mile link through the mountains in Southeast Kentucky, which is the only remaining obstacle to travel from north of the Ohio to Florida. Two-thirds of the required fund is assured, and construction will begin as soon as the full amount is pledged.

The completed link will permit driveways for cars and trucks made in the North and help relieve railroad freight congestion, besides providing a winter and summer highway for tourists driving south and north.

150,000 AT WICHITA SHOW

Wichita, Kan., Oct. 13—The motor show held in connection with the fair here was such a success that all space money was refunded to the dealers. Paid admissions amounted to more than 150,000. The location of the show building helped attract visitors as it was at the very entrance to the fair grounds. Features of the week were addresses by Major-General Leonard C. Wood, Governor Capper and Franklin K. Lane, Secretary of the Interior.

The Jones Motor Car Co. of Wichita was the only manufacturer represented directly and reports 217 cars sold wholesale and retail, several agencies being closed. Closed cars went quickly, and the truck attachment companies had an excellent exhibition, as most of the visitors were from the farms of the community. Dealers have planned to hold an exclusive show next spring.



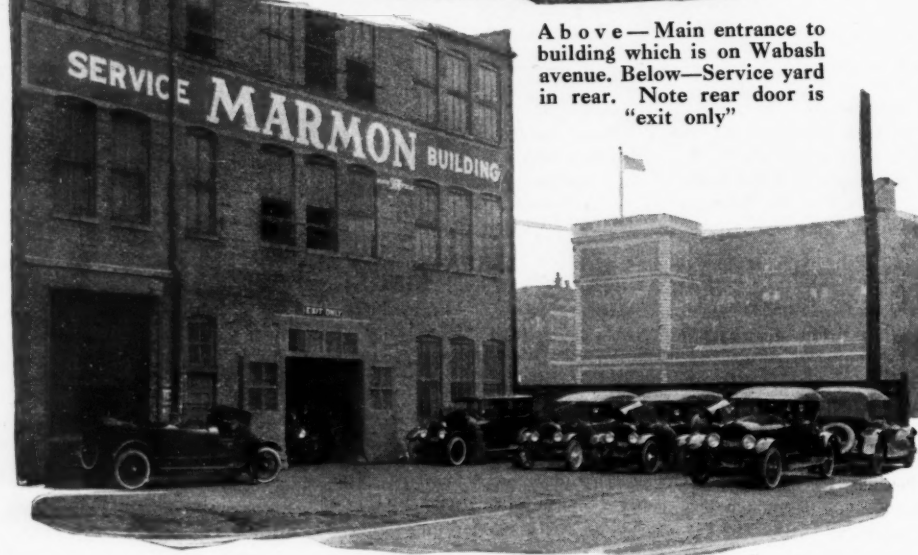
The christening. From the looks of longing on the faces of the chilled motorists you may infer that honest-to-goodness champagne was used—and it was

Marmon Service to 1100 Owners

Chicago Station Shows Initiative in Arrangement



Above—Main entrance to building which is on Wabash avenue. Below—Service yard in rear. Note rear door is "exit only"



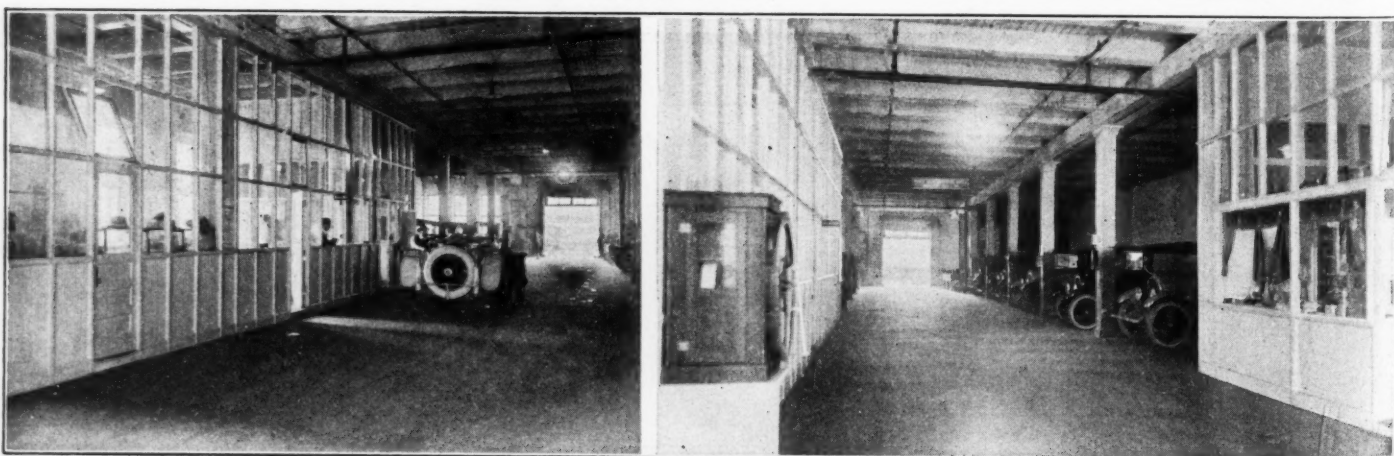
FORTY thousand square feet under roof and an adequate yard for minor adjustments are found in the new service station just opened by the Marmon Chicago Co. Here service is rendered to over 1100 Marmon owners in the territory within a radius of 100 miles from Chicago. The new Marmon station is laid out to give service, plus.

Entrance to the building, which is a three-story structure, is effected from Wabash avenue. The practice of having a service station entrance from a main street is not common along the row. Most often entrance is made through the alley. On entering the building, the first office on the right is that of the service manager, who, by the way, has been in charge of Marmon service for ten years. Next to the service manager's office is an accessory show room and waiting room combined. The practice of combining these two is becoming rather common along the row nowadays, for customers, while waiting, are attracted by the display of parts and fittings. Only accessories for Marmon cars are carried and only service on Marmon cars is rendered.

All the Comforts of Home

On the left of the entrance are the accounting offices and adjoining is the office where service orders are taken. Immediately beyond is a chauffeur's room, where the owner's driver may wait while minor repairs and adjustments are made. Here are the latest trade and popular magazines. When the car owner, or his chauffeur, drives into the main entrance, he is waited upon by one of several men who question him as to his requirements. The car then is turned over to the service men and an estimate is given of repair cost.

Such repairs and adjustments as can be made quickly are done either in the rear on the main floor or in the yard beyond the building. The repairs which require more time are taken to the third floor, in the rear of which is an adequate machine shop and along the sides benches, well lighted,



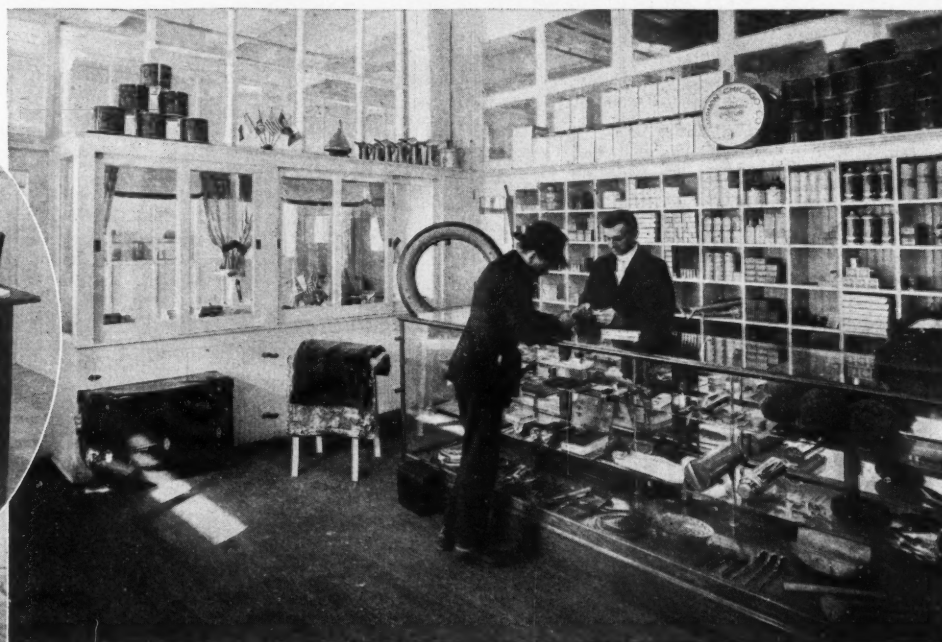
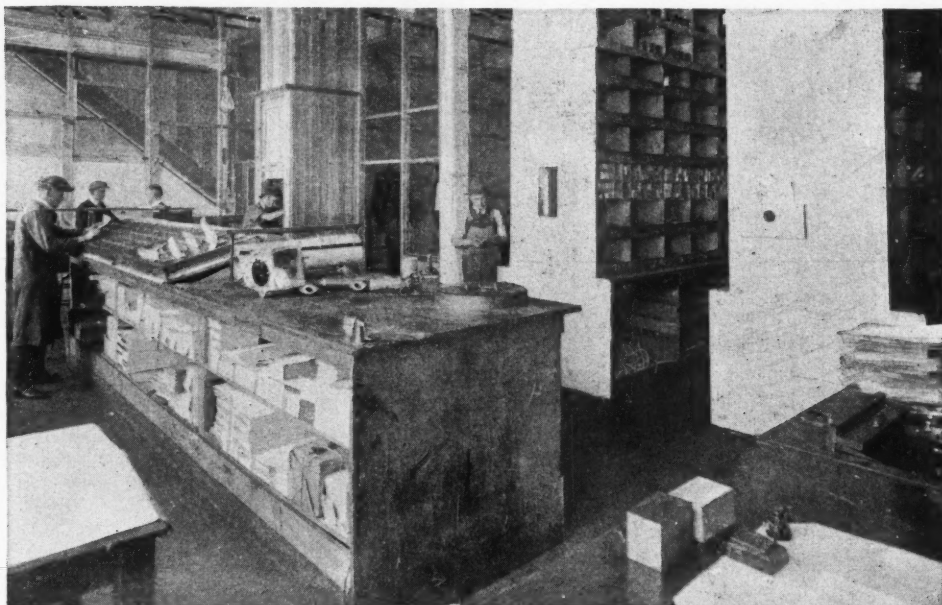
Left—Left side of main aisle, first floor, showing service order, accounting department and chauffeurs' room. Right—Right side of same aisle, showing accessory department with window display

there being an electric light at frequent intervals along and directly over the bench, besides ceiling lights. For each car brought onto the floor there is a box into which all parts taken from a car are placed and put under lock and key. Thus the owner is assured of having the same parts put back into his car that were taken from it. Practically every man who works in the service building was at one time in the Marmon shops and knows the Marmon thoroughly.

On the second floor is the stock room, in which a complete supply of parts is carried. These run into a value of \$50,000 and the Marmon Chicago Co. prides itself in being able to make replacements without delay in all cases.

There also is room on the second floor to store cars taken from the shop on the third if occasion requires. No paint jobs are handled, but there is a battery room where storage battery service is given.

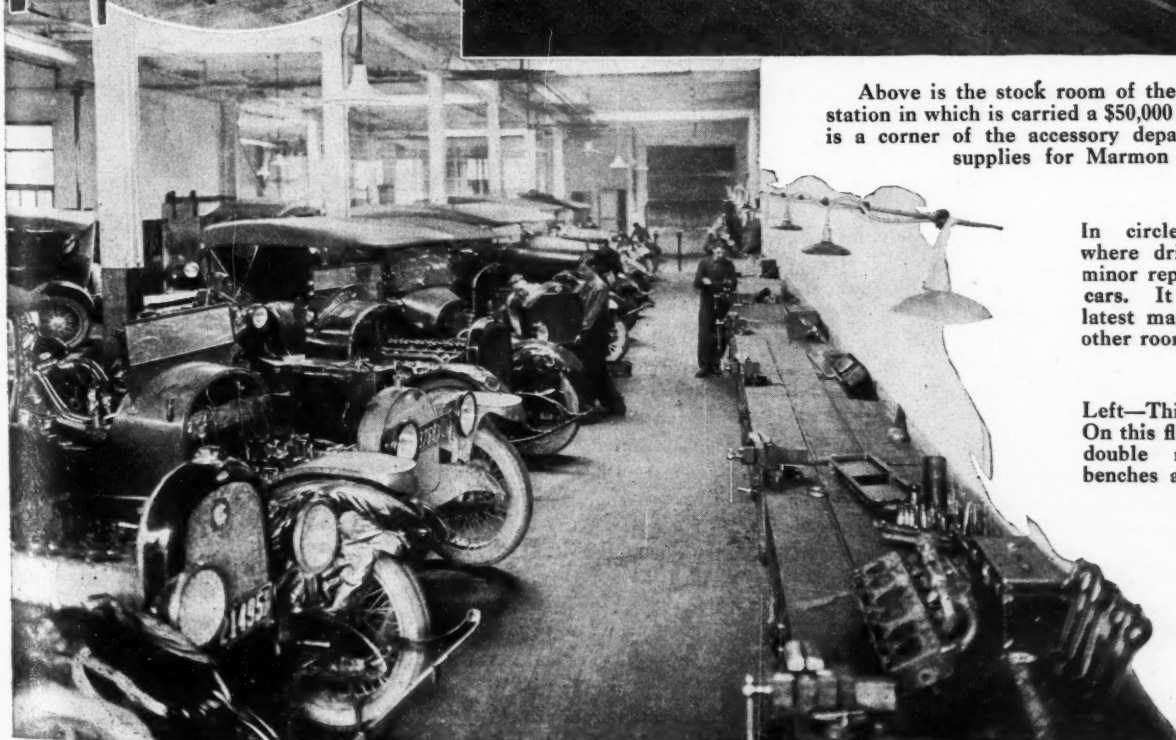
The building is kept scrupulously clean and there are signs everywhere asking that employees aid in keeping the floors free from dirt and grease for good service.



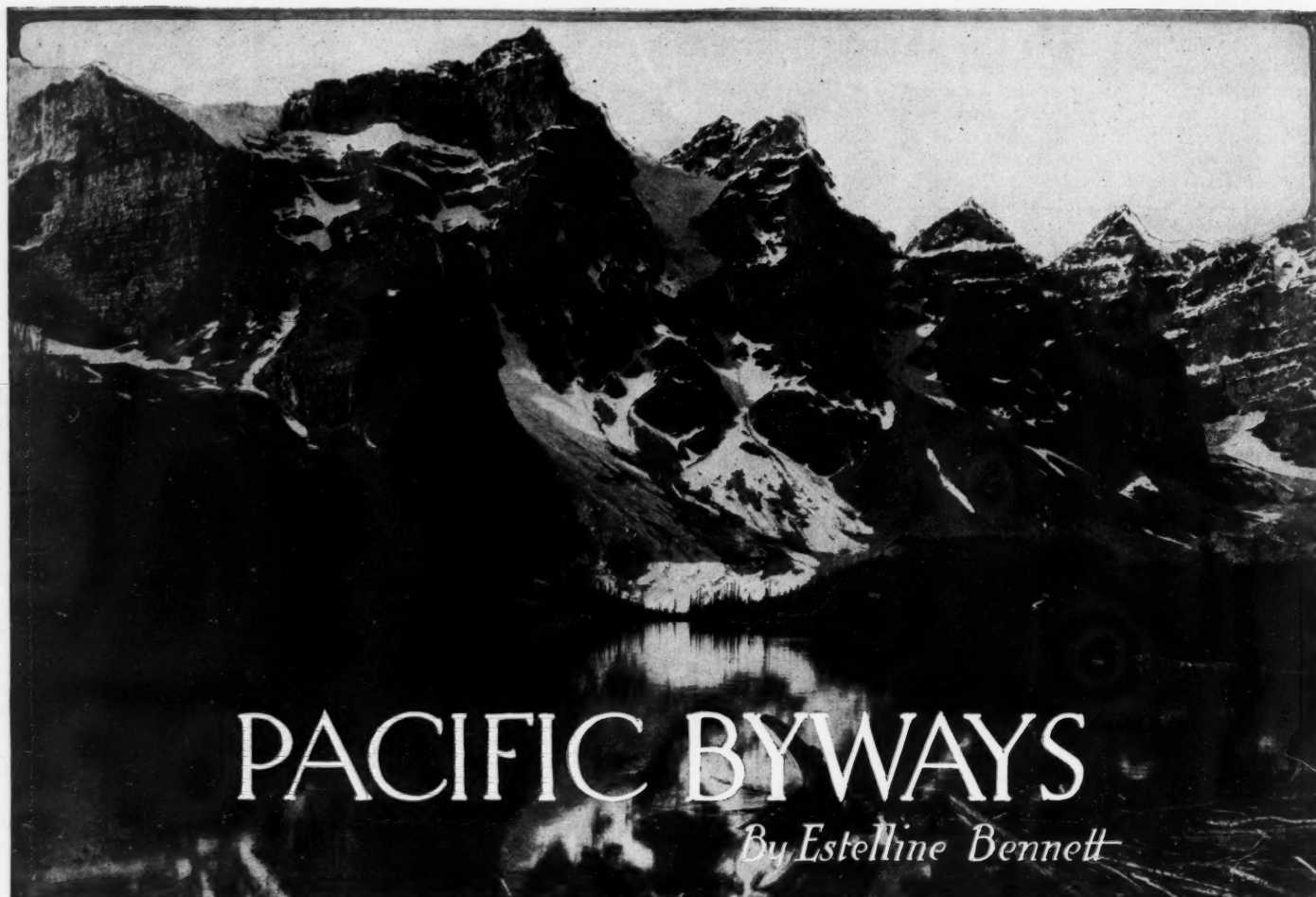
Above is the stock room of the Marmon-Chicago service station in which is carried a \$50,000 stock of parts. Below is a corner of the accessory department which handles supplies for Marmon cars only



In circle—Chauffeur's room, where drivers may wait while minor repairs are being made to cars. It is stocked with the latest magazines. There is another room for the owner-driver



Left—Third floor repair shop. On this floor there is room for a double row of cars. Work benches are well lighted by incandescent bulbs at regular intervals the full length of the bench. Skylights also assist in lighting. Only men who have seen Marmon factory service are employed here



PACIFIC BYWAYS

By Estelline Bennett

THE by-ways that beckon the traveler along the Pacific motor drive of Canada are bewildering and beguiling enough to prolong his journey from weeks to months and yet leave many a tempting trail for the next year. There literally is no end to them, because each year some new road is thrown open to the motor car, and by the time to-day's youngest motorist is making plans for his centennial birthday there may be broad hard motor roads across the Peace River country, the swamps that now guard the wild buffalo of the north and into the heart of the Arctic zone. It is scarcely stranger or more improbable than the easy highways through the Canadian Pacific Rockies would have seemed a hundred years ago.

Banff Roads Radiate

The best known cluster of by-ways which radiate from the main highway are the roads in and around Banff, where the roads closed to the motor car are becoming more scarce each season. The horse still has exclusive right of way over the famous spiral drive on Tunnel mountain, but the wonderful scenic ways to Sundance canyon and to the upper hot springs were opened last year to the motor car.

To Sundance canyon the road lies along the Bow River valley for the first part of the way with changing pictures of the wooded river banks and the snow-capped peaks and ranges that wall in the village of Banff. At the canyon itself the motorist

The Valley of the Ten Peaks seen from the motor road between Banff and Lake Louise

leaves his car, but that is not the fault of his mode of travel, for his friend who rode out ahead of him leaves his saddle horse at the same place. To see the Sundance canyon it is necessary to climb a steep, narrow, little trail for a short distance, and the more ambitious may go on up a rough mountain side to the level space on a mountain top where the Indians long ago danced their sun dance.

The road to the upper hot springs is one of the most beautiful short drives around Banff. It leaves the main road just a little way beyond the bridge across the Bow river and climbs steeply but persistently past the red-roofed club house of the Alpine Club of Canada until it comes to the group of buildings on a high flat and the thick yellow water from the upper sulphur spring. It is an after-dinner drive from the hotel, and in Banff in the early summer, when it is never dark except for a few unnoticed hours between midnight and the impatient dawn, there is a long lovely twilight after the late dinner. In the clear dusk of these evenings the outlines of the mountain peaks and ranges stand out clearly defined against a sky more amber than blue. Everything in the world is obscure and vague but the trees that stalk close beside the car and the sharply outlined, massive, important

mountains. No one really knows the Canadian Pacific Rockies until he has studied them at dusk.

The loop drive slips away from the road the moment the Bow River bridge is crossed. It runs along the bank of the river as it loses its calm and hurries first into a whirl of rapids and then into the tumultuous roaring of madly-excited Bow River falls. Below the falls and on the other side of the road steep trails lead up through the woods to the Banff Springs Hotel standing like an old Norman castle on the high cliff above. Across the Spray river the car slows a little and then hurries away to the golf course among the clouds which lies farther down between the river and Mount Rundle. And then just as the man at the wheel thinks he cannot avoid running into the brown and purple-shadowed, snow-capped Inglismaldi range, the road swerves to the right and makes its loop through thick lovely woods and comes back to the golf course and the way it came.

The Road that Blossoms

The road to Buffalo park, taken by all tourists, blossoms once a year into a gay thoroughfare that looks like the way to the Derby races and the ring of a wild west show combined. That is the annual Indian Sports day, which in itself is worth a continental journey. But during the quieter times the buffalo and their wild friends, the deer, sheep and goats, entertain many



A bit of good road that was built in the early days of British Columbia for the gold seekers. It is now a part of the Pacific highway

guests who come, some in motors, some in tallyhos and some on horseback.

The roads through the Rocky Mountain National Park, of which Banff is the official center, have set the pace for all the western Canadian roads. They are of the finest macadam and gravel and radiate in all directions from Banff. The motor drive, so far as the park is concerned, begins at Kananaskis on the Calgary-Banff coach road, runs into and through Banff, crossing the railway track near the depot and going by the Vermillion Lakes and Massive range to Castle Mountain and on to Lake Louise. More than 40 miles had been opened within the park early last summer, and the work was pushed rapidly through the open season.



Indian Day Parade starting from Banff Springs Hotel. On this day tourist make the road to Buffalo Park alive with travelers

In the village of Banff the principal roads are of macadam and rocmac. They are very broad and level and radiate in all directions to all points of interest, including the hot springs and cave where there is a large outside pool of water so warm that it is open the year round, which recently has been completed by the Government.

One place where the drive on its way from Vancouver has turned east toward Banff at the entrance to Sinclair Pass has two hot springs, so hot that an egg will boil hard in 11 min., and close by—so close that a man can dip water from one to the other without taking a step—is a stream of ice cold water. It is just a little instance of the charm of contrast all along the way.

Along this road, which is twentieth century in all its aims and details of building, every curve and turn still has its association of Indian and pioneer tradition and history. Going east from Banff to Calgary and south through the foothills and ranch country, the motorist comes to old Fort Macleod, where the Royal North West Mounted Police had their first station in Alberta. From Macleod south to Water-

ton Lake and through the Mormon settlement at Carson, there is the beguilement of good fishing all the way. From Banff there is an excellent road to the reserve of the Stony Indians, a trail over which the Indians and their friends took several hard days, fording streams and climbing over fallen trees to respond to the call, a quarter of a century ago, to come and entertain the flood-bound guests of the Canadian Pacific railway at what proved to be the first annual Indian Sports day.

Route Information

EDITOR'S NOTE

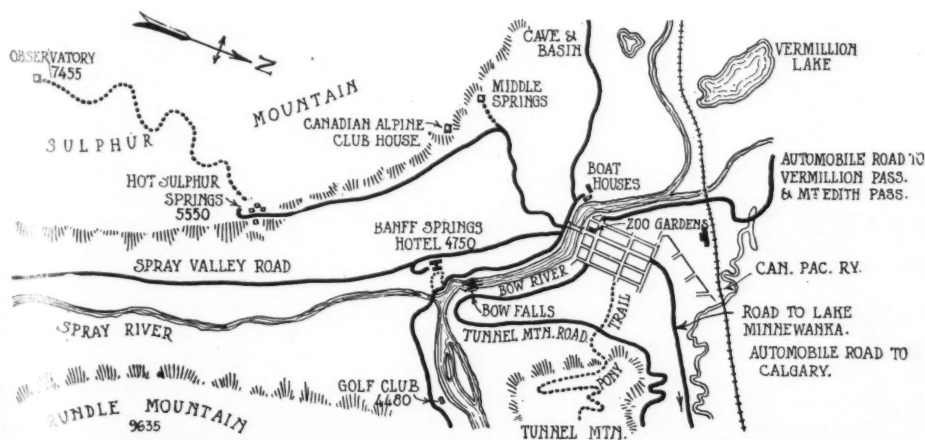
MOTOR AGE outlines route itineraries for its readers by letter. Each week only a few of the routes asked for are published, these being those of more general interest. In asking MOTOR AGE for routes, write your name and address distinctly on a return envelope.

Cumberland, Wis.—Detroit

Cumberland, Wis.—Editor MOTOR AGE—Outline a route from here to Detroit.—Marcellus D. Allen.

Go to Rice Lake, Cameron, Chetek, Raglepoint, Chippewa Falls, Stanley, Withee, Owen, Abbottsford, Spencer, Marshfield, Stevens' Point, Amherst, Waupaca, Weyauwega, Fremont, Redfield, Dale, Oshkosh, Fond du Lac, Theresa, St. Lawrence, Schlesingerville, Meeker, Menomonee Falls, Milwaukee, Rawson, Franksville, Corliss, Fort Sheridan, Highwood, Highland Park, Glencoe, Winnetka, Wilmette, Evanston, Chicago, South Chicago, East Chicago, Calumet, Gary, Aetna Station, Miller, East Gary, Porter, Michigan City, New Buffalo, Three Oaks, Sawyer, Bridgman, Stevensville, St. Joseph, Benton Harbor, Riverside, Coloma, Watervliet, Hartford, Lawrence, Paw Paw, Kalamazoo, Galesburg, Augusta, Battle Creek, Marshall, Albion—make a detour here to Concord—Spring Arbor, Jackson, Leoni, Grass Lake, Sylvan Center, Chelsea, Ann Arbor, Ypsilanti, Denton, Canton, Wayne, Inkster, Dearborn to Detroit.

Vol. 5 and 4 of the Automobile Blue Books published 910 South Michigan avenue, Chicago, contain complete running directions from Chippewa Falls on.

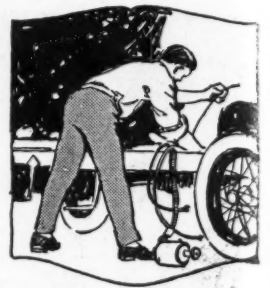


Map of Pacific byways of Canada, showing the many branches from Banff, the logical center of the Canadian Pacific Rockies highways



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the sixty-fifth installment of a weekly series of articles begun in MOTOR AGE issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York, in a size to fit the pocket conveniently.

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems, and the relations of current pressure and resistance were brought out. This was followed by an explanation of series and multiple circuits, how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was considered. A section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and the best methods of charging them. Magnets and electromagnetism then were considered, and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. Electric motors and engine and motor connections then were considered. Ignition was taken up next.

Part LXV—Battery Ignition Systems

THE battery ignition system manufactured by the Westinghouse Electric & Mfg. Co. operates on the closed-circuit principle. The complete system, breaker, distributor and coil, is self-contained as shown in Fig. 357. The unit operates in a vertical position, and its shaft is driven from the cam, or magneto, shaft through suitable gearing. The case of the instrument measures approximately $3\frac{1}{2}$ in. in diameter and 5 in. in height.

The breaker mechanism is shown in Fig. 358. It is mounted beneath the coil, while the distributor mechanism is directly above the coil. Since the system operates on the closed-circuit principle the contacts normally are closed. In operation, rotation of the cam separates the contacts against the action of a small spring under the left-hand side of the arm, A, as shown in Fig. 358. This spring always is under compression. The cam is mounted loosely on the shaft, but a small pin in a collar, or

hub, on the shaft against which the cam rests enters a hole in the cam and provides the necessary driving connection. The breaker mechanism operates equally well in either direction, and a backward travel of approximately 48 deg. is possible without causing the contacts to separate, which might result in a disastrous back-fire of the engine.

The condenser is mounted close to the breaker mechanism in a special compartment cast integral with the main base plate. This compartment is on the same level as the breaker mechanism but on the opposite side of the shaft, as shown in Fig. 358. The condenser, coil and breaker are inclosed in a tube of Bakelite Micarta, which forms the body of the unit. Several openings are cut in the lower end of this tube to provide a means of making the necessary internal electrical connections and to give access to the breaker mechanism for inspection, cleaning and adjustment. A short thin tube is placed over the main tube, forming a cover for the openings in the large tube. This short tube may be raised directly upward, thus uncovering the openings.

The distributor is the same as that used in all the Westinghouse systems, in which a circular carbon brush makes contact with the various high-tension terminals which are included in the molded cover. One terminal of the secondary winding of the induction coil is connected to the carbon distributor brush by a metal ring mounted on a disk of insulation directly above the coil. The carbon brush extends through the end of the distributor arm and rests on the upper surface of the metal ring, which is connected electrically to the end of the secondary winding.

The ignition switch is of the snap type and combines the lighting switch in one plate, which is mounted flush on the dash. Each time the ignition is turned the polarity of the circuit is reversed.

In adjusting the breaker the contacts should be dressed with a fine file and adjusted so that the maximum opening is .008 in. A feeler gage is furnished with each outfit by the makers. The spark-plug gaps should be .025 in. The distributor brushes should slide freely in their holder, and the spring should push the top brush out to extend from the holder about $\frac{1}{4}$ in. when the distributor plate is removed. The only lubrication required is two or three drops of oil about once a month in the oil cup on the side of the distributor unit.

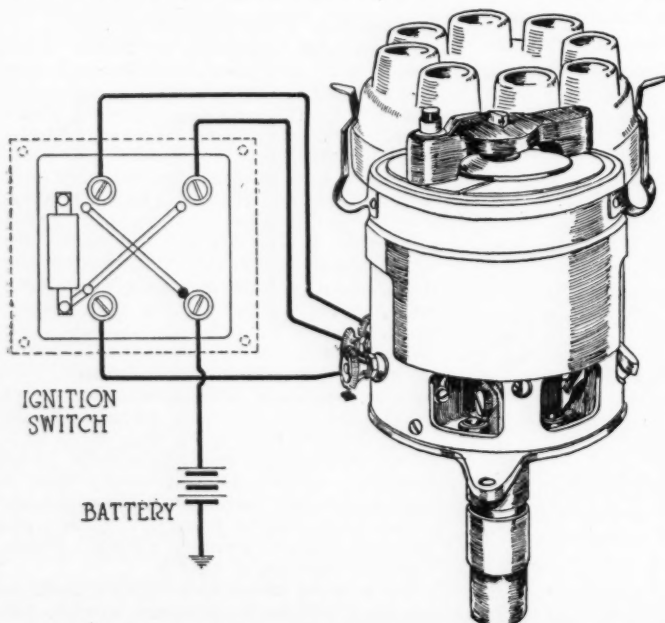


Fig. 357—Complete Westinghouse battery ignition system

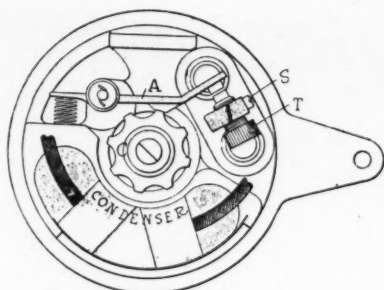


Fig. 358—Westinghouse breaker mechanism

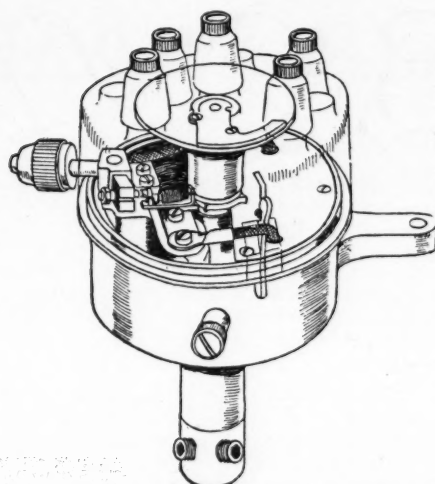


Fig. 360—Inter-relation of parts in Philbrin system

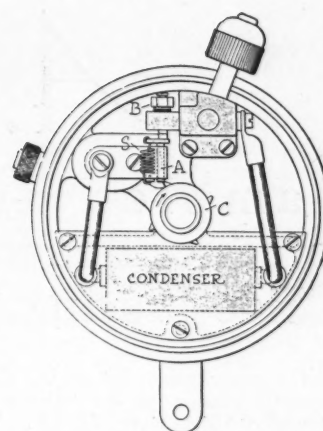


Fig. 361—Top view of Philbrin breaker mechanism

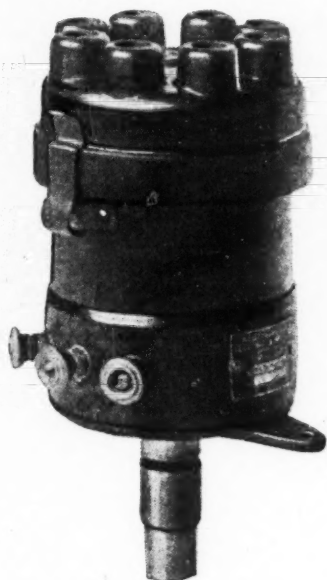


Fig. 359—External view of Westinghouse unit

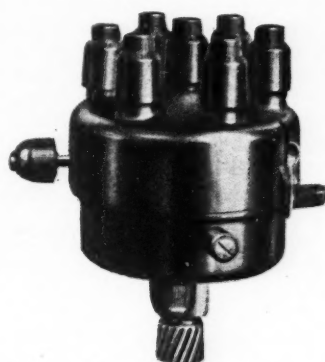


Fig. 363—External view of Philbrin combined breaker-distributor unit

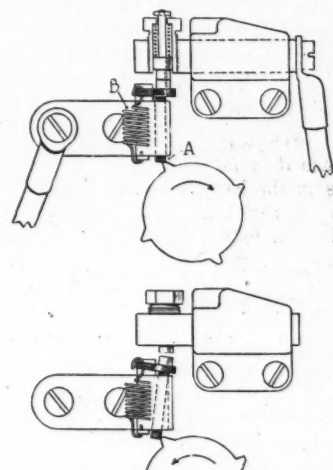


Fig. 362—Operation of Philbrin breaker mechanism

What is termed a ballast coil is mounted in the back of the switch plate. This ballast coil is a small resistance in series with the primary winding of the coil, and its function is to protect the winding and prevent excessive drain on the battery should the engine happen to remain idle with the switch in the "on" position. If this coil should be broken the ballast terminals may be short-circuited temporarily with a piece of wire or with a standard 5-amp. fuse. An external view of the device complete is shown in Fig. 359.

Philbrin System

The Philbrin ignition system, manufactured by the Philips-Brinton Co., is both a single- and continuous-spark system. Either type of ignition may be used at will. The inter-relation of the various parts of the combined breaker-distributor unit is shown in Fig. 360. The distinctive feature of the system is the breaker, which supplies a single spark of great intensity, the quality of the spark remaining practically the same for all engine speeds.

The construction of the breaker is shown in Fig. 361 and its operation in brief is as follows: Rotation of the cam C, which is in effect a series of tiny triggers, pushes out the arm A, thus closing the contacts, which normally are open. When a trigger passes the arm the contacts are separated by the spring S instantly. The contacts are held together for approximately $3\frac{1}{2}$ deg. of the revolution of the cam. It is this breaker mechanism that gives the single spark. If the cam is rotated the wrong way the triggers simply push the arm A out of the way, it being mounted in a specially-shaped hole in its supporting member, as shown in Fig. 362. The continuous spark is controlled not by the breaker mechanism but by a tiny vibrator of special form contained within the switch assembly.

The vibrator operates at four to five times the speed of the

ordinary vibrator. As long as the engine is running a continuation of sparks is produced, and this stream is distributed, as are the sparks from the single-spark portion of the system, by the distributor mechanism. The distributor has a long arm with a blade of peculiar force. This blade does not touch the high-tension terminals molded into the Bakelite cover but passes in very close proximity to the terminals, and the spark passes a small air gap. The reason for this long blade is to insure a continuous stream of sparks at the plug during a considerable portion of the piston travel. This stream of sparks is an advantage when the engine is cold or the carburetor is slightly out of adjustment, for it practically insures firing the mixture.

The Philbrin switch provides for two sources of current, the usual storage battery and an auxiliary set of dry cells, the arm of the switch being moved in one direction for the storage battery and in the opposite direction for the dry cells. The lever which controls the operation of the continuous-spark and single-spark operations is a small continuously rotary plug. This plug is marked alternately M and S, signifying whether the main or secondary systems are in operation. This special switch also reverses the polarity of the circuit each time it is turned, thus increasing the life of the contacts. The ignition coil is mounted in a waterproof case and may be mounted on the dash or, in some installations, directly with the distributor mechanism.

The system has but one adjustment, and this has to do with the opening of the contacts on the main, or single-spark, system. The gap between the contacts should be from .025 to .030 in. The method of making the adjustment is obvious from an inspection of Fig. 362. The vibrator for the secondary system is housed in the switch assembly and will never require any adjustment. The manufacturers strongly urge that it never be touched. An external view of the Philbrin combined breaker distributor unit is shown in Fig. 363.

A. B. C. of Aviation

Examples and Forces of Biplane Side-bracing

From a paper presented at the first aeronautic session of the Society of Automotive Engineers by F. W. Pawlowski

IN Fig. 26 is shown the side-bracing of the Bleriot monoplane-bus on which the rear spar is braced to the lower girder of the single-lift truss. This arrangement is more advantageous than that of Fig. 27 because it is more economical and the two wires on the Etrich-Taube offer about twice as much resistance as the single strut in Bleriot's construction. The side-bracing of biplane wings offer many possibilities of design. The most common types, Figs. 28 and 29, are based on the same principle, but adapted respectively to the straight and staggered biplane.

Figs. 30 and 31 show the N-type side bracing, with which the resistance of the wires of the ordinary bracing, Figs. 28 and 29, can be decreased by half. Fig. 33 shows the V-type bracing, found in the modern Nieuport scouts. The two converging struts are fixed in a special socket fitted between the spars of the lower wing. This is also adaptable to straight biplanes, Fig. 32, but in both cases is especially good for an unequal-chord biplane.

In 1909 Breguet produced the single-lift truss biplane, his main object being to vary automatically the angle of incidence of the wings, which were hinged to the tubular spars, Fig. 34. In Dornier's flying boat an I-type side bracing was used, Fig. 35. Here the struts were fixed in sockets having long bases that reached from the front spar to the rear spar and were fixed to the spars.

In the double-lift truss system the forces acting on each truss depend upon the position of the center of pressure; at first flight and a small angle of incidence, the rear truss carries a greater part of the total load, Fig. 37. At slow flight and large angle on incidence, the reverse is true, Fig. 36.

Fig. 38 shows a K-type side bracing having many advantages. Besides, as can be seen from the action of the forces in Figs. 40 and 41, the extra bending moments in the I-type strut due to the cantilevers, sockets, are eliminated. Fig. 39 shows the Curtiss single-lift truss built up of two steel tubes, one bent as shown.

The X-type of side-bracing, Figs. 42 and 43, offer certain advantages, especially as compared with the type generally used at present, Figs. 28 and 29.

AIR-O-FLEX TRUCK \$1,700

Detroit, Oct. 12—The Air-O-Flex Motor Corp., has completed plans for a group of factory buildings which will be constructed

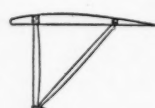


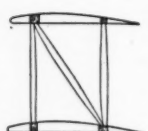
Fig. 26—Bleriot Bracing



Fig. 27—Etrich-Taube Bracing



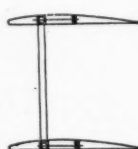
Figs. 28 and 29—Common Biplane Bracing



Figs. 30 and 31—N-Type Bracing



Figs. 32 and 33—V-Type Bracing



Figs. 34 and 35—Single Lift-Truss



Figs. 36 and 37—Forces in Double Lift-Truss



Fig. 38—Capt. Martin's K-Type Bracing

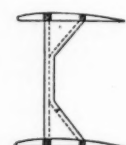
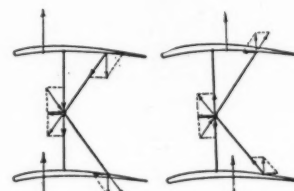
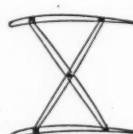


Fig. 39—Curtiss K-Type Lift-Truss-Strut



Figs. 40 and 41—Forces in K-Type Bracing



Figs. 42 and 43—X-Type Side-Bracing



Figs. 44 and 45—Forces in X-Type Bracing

Examples of biplane side-bracing and forces that determine design to some extent. Although almost too advanced to be called part of the A. B. C.'s of aviation, it nevertheless is elementary in showing how forces influence wing-bracing and construction

in units with more than 300,000 sq. ft. of floor space. Construction of the first unit starts at once. The 1½-ton truck which the company will produce is fitted with a Continental engine, 3¼ by 5¼. The price of the chassis with cab will be \$1,700.

EARNINGS ARE \$27 A SHARE

New York, Oct. 12—The largest earnings in the history of the United States Rubber Co. are reported in the first six months' statement of this year. During that period the company earned \$7,239,966, an increase of 53 per cent over the same period of 1916 when \$4,920,650 was earned. The 1917 earnings are after deducting

\$500,000 for special war tax. The earnings are at the annual rate of \$14,479,932, or \$27 a share for the \$36,000,000 common. The company earned \$15.12 on the same amount of stock in 1916. Business for July, August and September was running at the same rate for the first six months.

MACKAYE RESIGNS RECEIVERSHIP

Detroit, Oct. 12—H. D. W. Mackaye has resigned as friendly receiver of the Ross Automobile Co. and reports that creditors will receive their full accounts and possibly something will be left for the stockholders. According to reports Mr. Mackaye will enter business for himself.



Canadian women now are serving as volunteer drivers of motor ambulances in France carrying wounded soldiers from back of the lines to the Paris Canadian hospital

THE process of becoming an ambulance or other motor vehicle driver in England is not all an easy one, judging from the driver's test which all applicants for a license must undergo. The Royal Automobile Club driving certificate is highly prized, and deservedly, for a driver who passes the strenuous tests wins by the might of skill.

The issuing of driving certificates for the operation of motor cars was one of the club's earliest activities, inaugurated in 1905. In pre-war days it served the chauffeur seeking employment, the public service driver and the private owner who cared to be examined for such a certificate. During war times these certificates have assumed national importance. The private chauffeur practically has disappeared, and those who take the examinations now are mostly women who are preparing to do the work of men called to serve in the army, to act as drivers of ambulances, who belong to the various women's corps and organizations and desire to enter as drivers in the Royal Flying Corps or Army Service Corps, or who wish to qualify for other Government positions.

The standard of efficiency, always high, has not been lowered for the sake of obtaining drivers in larger numbers for war work. The holder of one of the certificates invariably is respected and is almost cer-

tain of getting employment in case of a vacancy. Forty a week are examined in London alone, and most of these forty are women.

There are five classes of driving certificates, the First Class, open to a candidate that has driven a motor vehicle for wages for an aggregate period of not less than three years and can show proof from his employer of good character. This examination consists of a driving test and a written paper on the candidate's mechanical knowledge. The Second Class is for candidates who can give proof that they have driven a motor vehicle for wages for an aggregate period of not less than six months, together with character references. The candidate has to undergo the driving test, write a paper on mechanical matters and answer questions as to road law. The Third Class is for proof of good character. These candidates take the driving test and answer verbal questions on road law. The fourth is for the owner-driver and the last for mechanical proficiency. To pass this last test may be considered the height of ambition in driving, as far as English are concerned anyway.

The owner-driver's certificate has the same tests as those for the Third Class. The candidate must not be, nor have been, engaged in driving a motor vehicle for hire or an instructor for payment. The certificate for mechanical proficiency is the most important. To take this examination the candidate must have served in an engineering works, have had two years in a motor car factory or three years in a motor car repair shop, and he is required to pass a written examination on the construction and repair of motor cars.

The club has examiners in most of the

Why the U. S. Is Fighting Waste—No. 4

A Pat of Butter

One pat, or serving, of butter is a little thing. There are about sixty-four of them in a pound.

In many households the butter left on the plates probably would equal one pat, or a fourth of an ounce, daily. This is scraped off into the garbage pail or washed off in the dishpan.

But, if every one of our 20,000,000 households should waste a fourth of an ounce of butter daily, on the average, it would mean 312,500 lb. a day—114,062,500 lb. a year. To make this butter would take 265,261 gal. of milk, or the product of more than 500,000 cows.

But butter is not eaten or wasted in every home, someone objects. Very well. Say only one in 100 homes wastes even a pat of butter a day. Then more than 1,000,000 lb. is wasted. Still intolerable, when butter is so valuable a food and every bit of butter left on a plate is so useful in cooking.

Making Woman Drivers

What the English Women Have to Do to Get Motor Certificates

provincial centers as well as in London. Each driving test takes 15 min. and consists of reversing and 10 min. in driving in the heaviest traffic that can be found in the neighborhood. Russel Court is on the route in London. This has a very narrow approach which is quite straight, a fairly wide space and a very narrow "S" bend. One woman failed through looking at the rear of the car while the front fenders added to the marks on the wall. The best woman driver in recent tests owned and drove a light car; the best man was school-taught, had worked hard and held the greatest contempt for the women who studied with him.

Failed Three Times

One of the candidates failed three times in succession. The first time he hit a handbarrow, the next time bent a fender while reversing out of Russell Court and the last time stopped the engine three times, leaving the gear in engagement each time he tried to start the engine. Finally he succeeded.

One woman started the test four times running by inserting first speed and then putting the brake hard on. Next, when she realized what she was doing, she put in the reverse instead. Another changed into high speed on a slight grade while the car was going at about 4 m.p.h., stamped on the accelerator several times in quick succession and exclaimed:

"It's not working; the accelerator won't work."

Another woman ran into the back wheel of a cart and called out, "Now, wasn't that bad luck?"

Usually the examiner has the candidate sign the card first, as some of them are unable to sign afterward. Then the test begins, reversing, driving through the heavy traffic and so on. A good many of the candidates come from motor car schools run by women, and only one has failed. She was criticised severely by the woman instructor for driving so badly.

Much of the instruction in driving is given by women to women abroad today.

PACKER'S DAUGHTER A WAR PILOT

Milwaukee, Wis., Oct. 12—Miss Helen Cudahy, daughter of Patrick Cudahy, millionaire packer, is to drive a motor truck on the French front and is taking a course in motor mechanics to fit herself for this service. Her work will be piloting a truck with supplies from the hospital center at Paris to outlying field stations.

WOMEN DRIVE TAXICABS

Detroit, Oct. 12—The Detroit Taxicab & Transfer Co. is employing women to operate their electric taxicabs. The women work between 7 a. m. and 6 p. m. and receive the same scale of wages as the men. More than 500 women have applied for the positions, and several already are operating the taxicabs with success.

The Readers' Clearing House

Timing of Valves

Timing Hupmobile 32 Engine

Q—Explain the proper method to time a Hupmobile 32; also the latest model Hupmobile.—A. L. Carter, Tulsa, Okla.

Details regarding the timing of all valves in the 1916-1917 Hupmobile are shown in Fig. 1. The diagram gives the position of the flywheel for the opening and closing of both inlet and exhaust valves and also gives the position on flywheel of the timing of the spark. In following out this diagram proceed as follows:

1—Set the crankshaft with No. 1 piston on top dead center. Set the camshaft so that the exhaust valve on No. 4 cylinder is just closing and inlet valve of No. 4 is just beginning to open.

2—With the crankshaft and camshaft in this position slip on the timing chain and connect it.

3—Place the spark lever in neutral position on the steering wheel sector. Move the flywheel 2 in. past dead center and set the unisparner in such a position that the breaker points will just trip or break with the distributor block pointing directly toward the radiator.

To time the Hupmobile 32 proceed as follows:

1—If the engine is still in the chassis remove the magneto hood from the foot boards, also take off the transmission cover.

Open the priming cups to make cranking easier, then turn the flywheel slowly and note the marks stamped upon the flywheel gear. These marks when turned so they are central with the opening of the transmission case indicate certain positions of the valves. The line marked E-C 1-4 when brought central with the opening in the transmission case indicates that the exhaust valve on No. 1 or 4 cylinder is just

closing. The line marked 1-0, 2-3 means that the inlet valve of either No. 2 or 3 cylinder is just beginning to open and so on.

To set the valves remove the timing chain and draw line A, Fig. 2, on the transmission case exactly in the center of the opening. Next turn the flywheel until the line marked E-C, 1-4 is coincident with the center line A. Next remove the valve spring cover so that you can watch the movement of the valves and tappets. Then turn the camshaft by means of the fan pulley until the exhaust valve on cylinder No. 1 has just closed. The exhaust valve

is the first one from the front, and a good way of noting the exact instant that the valve seats is to slip a thin piece of paper in between the tappet and the end of the valve stem when it is seated. As you turn the camshaft and the valve is raised naturally the paper will be pinched but just the moment the valve is closed the paper slip will be released. You have now set the camshaft in its proper relative position with the flywheel, crankshaft and pistons and therefore the next thing to do is to set the magneto so that the spark will occur at the proper point of the stroke. Referring to Fig. 2, move the spark advance lever D to full retard, that is, all the way down. Take off the brass cap held on the lower part of the rear end of the magneto by a flat spring, thus exposing the circuit breaker. Turn the armature over two or three times and note how the two platinum breaker points separate as the breaker arm C makes contact with the flat cam. The spark occurs in the cylinders at the instant the breaker points separate.

Step by Step

Remove the rubber distributor plate F by squeezing the springs G against the magneto and at the same time pulling off the plate. Turn the armature shaft until the distributor brush E is in the position shown in Fig. 2, at which time the breaker points will be just about to separate. Now being careful not to move the camshaft or flywheel, put on the timing chain. If it is necessary to, move the timing sprocket slightly in order to get the chain on. It is preferable to move the armature in a left-handed direction, since for perfect timing the spark should occur when the firing line B coincides exactly with line A. Now test the accuracy of the timing by turning the flywheel over two revolutions. If the breaker points separate when the firing line is within half an inch of either side of the center line, the timing is correct, but if the timing is more than $\frac{1}{2}$ in. off, it will be necessary to remove the chain and turn the magneto drive sprocket one tooth in the proper direction. A movement of one tooth will make a difference of $2\frac{1}{2}$ in. on the flywheel. If the breaker points separate before the line B is on center, the spark is too early and the armature should be moved in a clockwise direction and if the spark is too late the armature should be moved in an anti-clockwise direction. If moving the sprocket one tooth causes the spark to occur too far in the opposite direction, one-half a tooth difference can be obtained by unscrewing the magneto driving sleeve nut A, Fig. 2, and pulling the driving sleeve B out of the slots in the magneto sprocket C. Then without removing the armature give the gear one-half a turn and recouple. When recoupling see that the cork oil retaining washers D and E are in their proper places and in good condition.

The camshaft and generator silent drive

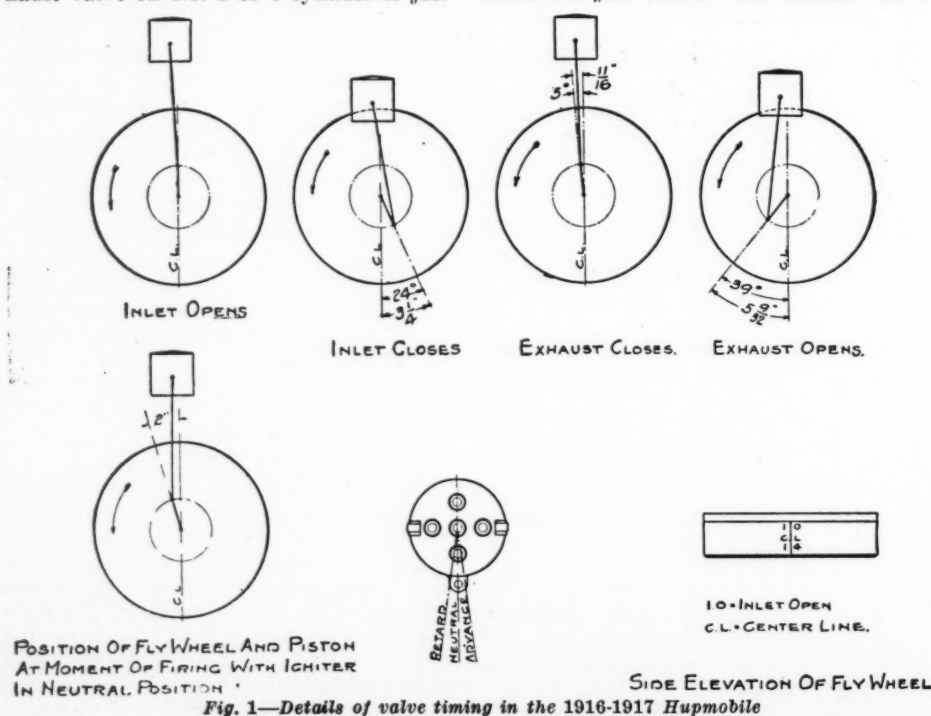


Fig. 1—Details of valve timing in the 1916-1917 Hupmobile

chains will stretch slightly after considerable service and they should be inspected and tightened if found to be loose after the first 2000 miles and once a year afterward. A chain is at proper tension when it does not sag between sprockets but can be pushed in about one-eighth of an inch at the middle of the longest span. To adjust, remove cover over the magneto sprocket and take off the four nuts that hold the magneto support, remove shims H, Fig. 2, from on top of the magneto support, pull the magneto straight up as far as it can be raised by hand and insert as many shims as required to maintain this height under the magneto plate. If the generator chain is so tight that it is impossible to take the necessary slack out of the camshaft chain, it will be necessary to loosen the two nuts that fasten the generator base to the crank case, also the two nuts on the generator sprocket bracket and slide the generator in a little closer to the cylinders. Push the magneto forward as far as possible when tightening up the nuts, to prevent oil from leaking around magneto shaft.

In case you have found it necessary to loosen the generator, do not forget to tighten generator chain by moving the generator away from cylinders and be sure to put in and spread all cotter pins.

Timing Valves on Model F Thomas

Q.—How far down from dead top center, in fractions of inches, should the piston be before the intake valve begins to open on a Thomas Four Sixty, model F? This is the chassis used by the Webb Motor Fire Apparatus Co. and weighs \$100 lb. loaded.

2.—Where should the piston be for the exhaust valve?

3.—Could the valve timing be changed to give more speed and power?—R. S. Kelly, Wichita, Kan.

We have no specifications of this engine, hence cannot give you definite information. Generally speaking, however, the intake valve should begin to open when the piston is on top dead center and just beginning to descend on the suction stroke. In some engines the valve begins to open slightly before this point is reached. Still other engines are timed so that the inlet valve opens anywhere from 3 to 10 deg. past dead center measured on the rim of the flywheel.

2.—The exhaust valve opens about 40 deg. before bottom dead center on the power stroke and closes from 2 to 5 deg. past top dead center at which time the intake valve is about to open. These are average figures and do not apply to all engines. Usually the flywheel is marked with a punch to facilitate proper timing.

3.—It is possible to change the timing of the valves so that the intakes open earlier, but such an engine does not throttle down, or idle very well. Better results will probably be secured by leaving the timing as it is, but adjusting the clearance between the stems and tappets to the correct gap. The intakes should have a little less clearance than the exhaust valves.

Miscellaneous

Valves and Oiling on Rebuilt Ford

Q.—I have rebored the valve ports on my Ford cylinder block $\frac{1}{8}$ in. on top and $\frac{1}{4}$ in. on the side; also the valve guides $\frac{1}{8}$ in. Where could I procure valves to fit— $1\frac{1}{8}$ in. by $\frac{5}{8}$ in.?

2.—Will the flywheel oil system work on a Ford if adjusted right? I would not intend

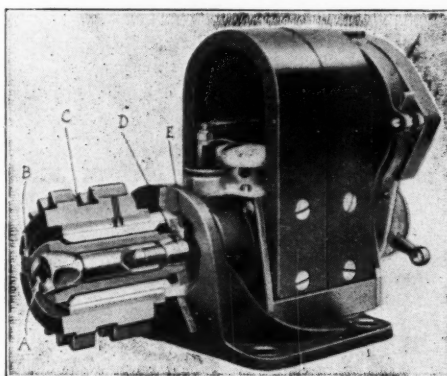
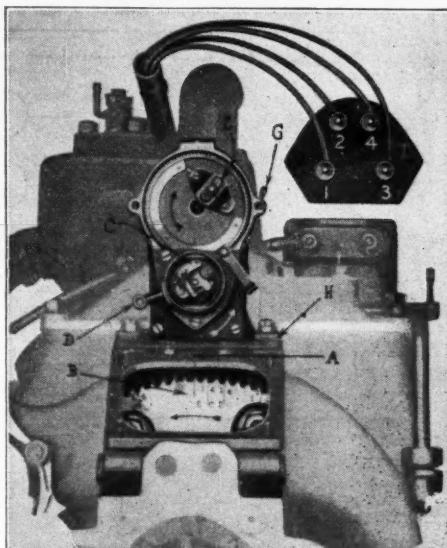


Fig. 2—Reference to the two illustrations above is made in explaining the timing of the Hupmobile 32

to oil pistons. Will they get sufficient oil from the connecting rods?

3.—Should a heavier valve spring than a Ford be used on the larger valve?—Noel Bullock, Madison, Neb.

1.—Write to the Rich Tool Works, Chicago, which concern, we believe, will be able to furnish you valves of the desired size.

2.—The Ford oiling system is all right for moderate speeds up to say 40 m.p.h. After that the oil, owing to vibration, is not positively carried back to the timing gear case by the internal oil tube. Hence

it is better to fit some sort of positive feed like a pump. You could arrange to drive a small plunger pump from one of the cams on the camshaft and have one oil lead going to the top of the timing gear case cover, oil being pumped from the crankcase. Such an arrangement was suggested by MOTOR AGE in the issue of June 7, and we have seen it successfully installed on several Ford cars rebuilt for fast work.

3.—Yes. The spring should not be so strong, however, that the valve is seated too heavily, which might cause breakage.

Layout for Modern Garage

Q.—I have a lot facing west, 60 by 110 ft., alley on south side. Give plans and specifications for a modern one-story up-to-date garage building that will fit a lot of this size. Glass front, with glass display window extending 10 ft. on south side.—L. S. Krough, Cameron, Texas.

You have not stated whether you desire a repairshop and you have ignored the question of a showroom, so we have put in both as we think it is imperative that you have these.

The fact that you are agent for four popular cars leaves no doubt in our minds but that a showroom will pay. It is just as necessary to have an attractive store to sell cars in as it is for your druggist or grocer for the display of their goods.

Dodge Brothers Valves

Q.—How much can the valves of a 1915 Dodge Brothers be enlarged?

2.—I can get 57 m.p.h. wit hit now; what speed can I expect with enlarged valves?—L. F. Sevier, Denver, Col.

1.—It would be unwise to attempt enlarging the valves more than $\frac{1}{8}$ or at most $\frac{1}{4}$ in. This is generally determined by the amount of stock around the valve ports. The danger of enlarging the openings too much lies in the fact sand holes may be run into which generally means a welding job, especially if they are in the water jackets.

2.—This depends on how much you enlarge the ports. It may also be an advantage to install a larger carburetor as the increase in valve size could take care of it.

Gear Lever Will Not Stay in Place

Q.—My 1914 Chandler Six will not stay in high gear when running 15 or 20 m.p.h. On a hard pull it will slip back to neutral from intermediate. What is the cause?

2.—Publish a drawing showing how this car would look if underslung and speedster body built for it. Let the seats be as low as possible, a fairly good sized gasoline tank, and the extra wire wheels down low behind the gas

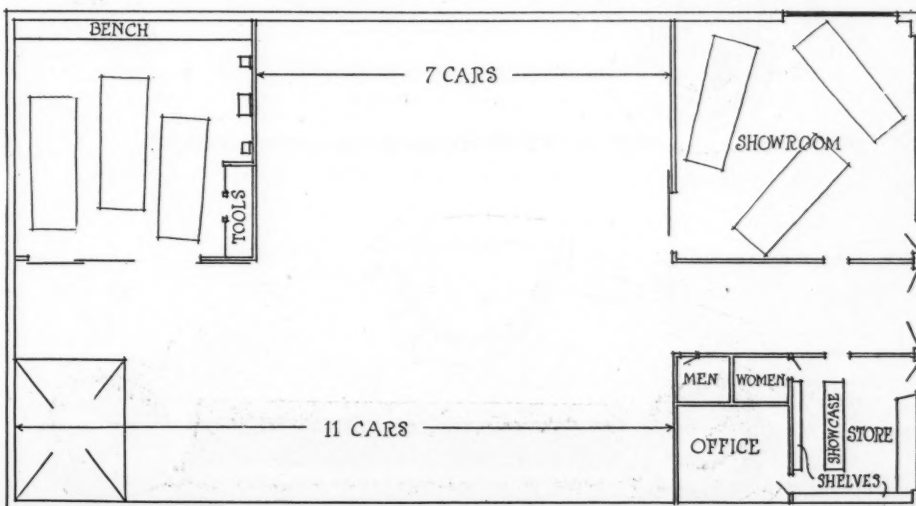


Fig. 3—Layout for modern garage on a lot that is 60 by 110 ft.

tank. What would be the approximate cost? Could a fourth speed be put on without too great cost?

3—How high could it be geared up without undue strain on the engine?—G. N. Gunter, Kansas City, Mo.

1—The reason that your car will not stay in high gear is that the shifter lock is worn. This will have to be replaced.

2—A suggestion for making a speedster out of this car is shown in Fig. 2. It is hard to say what the cost would be, for so many things must be taken into consideration. Probably it would be in the neighborhood of \$150 to \$200.

3—A gear ratio of about 2 to 1 would be as high as you could go.

Engines

Engines Used in Three Cars

Q.—What make of motor is used in the Grant Six, in the Oakland six, and in the Baby Grand Chevrolet?

2—The Baby Grand Chevrolet, Oakland and Grant Sixes claim valve-in-the-head motors, and the Oakland Six and Chevrolet have the plugs near the top set at an angle of 45 deg., while the Grant Six is about one-third of the way down on the motor, set in the side at right angles. Would there be any difference in this arrangement in regard to carbon or power?

3—What is the rated power of the Oakland Six and Chevrolet at their maximum speed, and what is their maximum speed?—W. R. McQuigg, Wooster, Ohio.

1—The Grant Six uses a Falls engine, the Oakland, a Northway and the Chevrolet Baby Grand, a Mason.

2—Both methods have their adherents in the motor car field and seem to work out satisfactorily. Theoretically it would seem that locating the plugs in the top of the engine would be the better practice, but certain engines so equipped are known to foul plugs as quickly if not more so than those which have the plugs in the sides of the cylinders. The shape of the combustion chamber has a bearing on the matter also.

3—The rated horsepower of the Oakland Six at 2800 r.p.m. is 73 hp. The maximum horsepower of the Chevrolet is around 24 hp. The maximum speed of these cars is

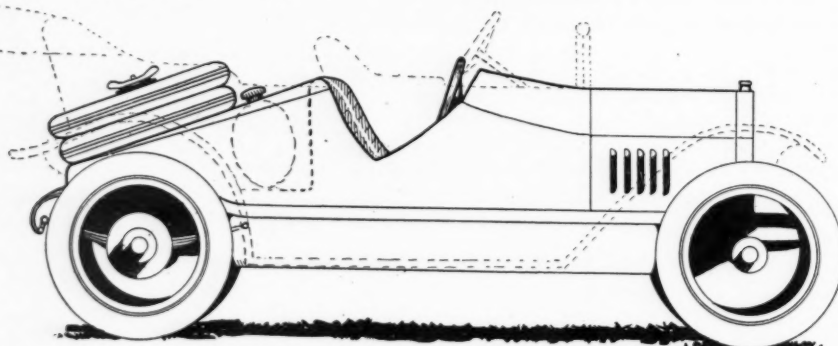


Fig. 6—Suggestion for converting a 1912 Everitt motor car into a speedster

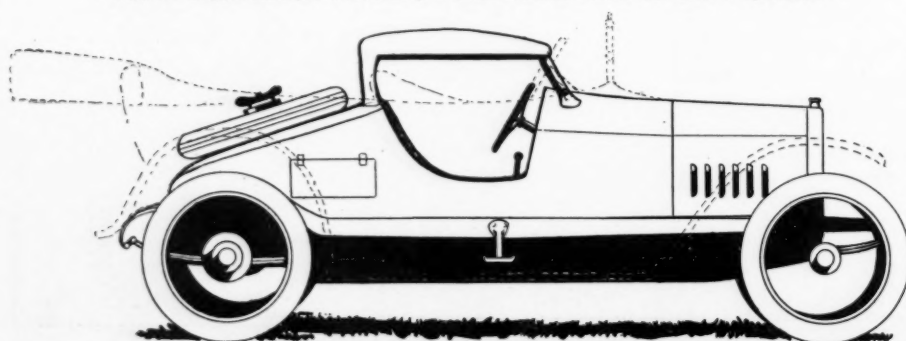


Fig. 7—How 1915 Oakland may be turned into speedster with same radiator

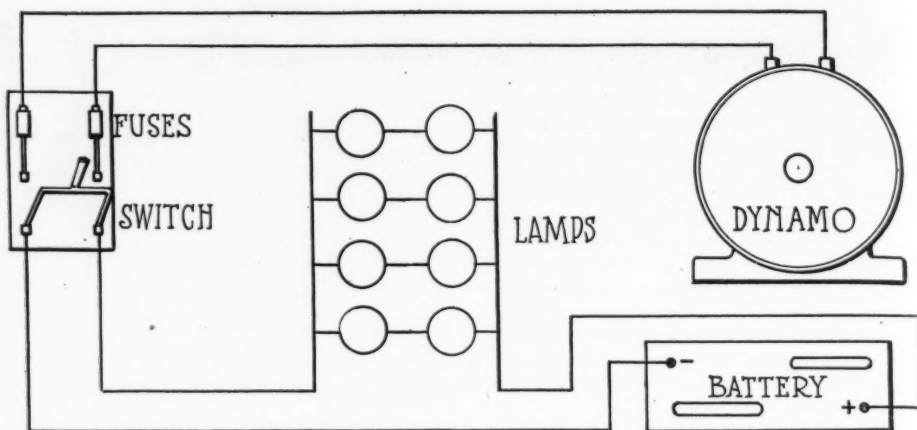


Fig. 4—Wiring diagram for a charging outfit for 220-volt direct current

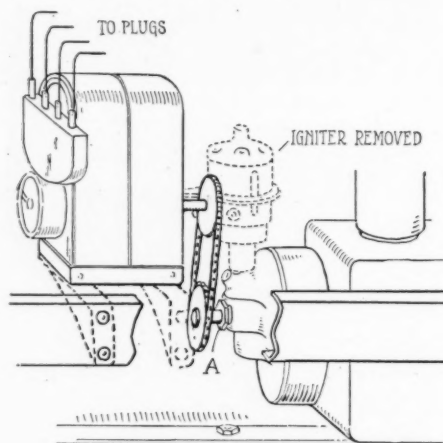


Fig. 5—Installation of high-tension magneto on a Chevrolet

not definitely known, but it should rank about the same as in cars of equal horsepower.

Horsepower of Overland Big Four

Q.—What horsepower must the 1917 big four Overland develop to make 5 m.p.h., 10 m.p.h., 35 m.p.h., and what is its maximum horsepower?

2—How many turns does the starter motor make to one of the engine? Is the ratio the same on all machines?

3—What percentage of the power does the generator use on a Studebaker four?—Walter Bromley, Spokane, Wash.

1-2—You will find both questions answered in the chart shown in Fig. 8. Note that column three specifies the horsepower required to drive the car on a level road against a normal road resistance and air resistance at the given speeds. Column four gives the horsepower developed on a dynamometer brake test of the engine alone at corresponding speeds. The difference between columns three and four gives the horsepower available for acceleration and hill climbing.

3—This information is not available.

Details of Oldsmobile Engine

Q.—What kind of engine has a 1917 Oldsmobile eight?

2—Does the 1916 Oldsmobile eight have the same engine?—C. Harvey Byers, Lewistown, Pa.

1-2—The same make of engine is used in the 1917 Oldsmobile as was used the previous year. There are a few changes in detail, however. The present engine develops 56 hp. at 32 r.p.m. while the 1916 showed 45 at 2800 r.p.m. There is more water space in the later model and special provisions are made in the Lynite pistons to prevent oil pumping.

Other changes include new system of counter-balancing the crankshaft, more efficient oiling of the timing gears, better fan drive, substitution of belt drive on generator in place of chain, location of spark plugs over intake valves, and several others.

The Electric System

Magneto on Chevrolet 490

Q.—One of our customers has a Chevrolet 490 and has considerable trouble in keeping the battery charged sufficiently to start the motor by the starter motor. I intend to put a high-tension magneto on his machine, and I should like to know how to put it on. Should the Chevrolet not have a 12-volt battery instead of a 6-volt for that kind of starter?—Wilmot Garage, Wilmot, Ark.

Failure to keep the battery charged may be caused by dirty, loose or not well-seated generator brushes; generator damaged by dampness, concussion or burned out; cut-out action hindered or damaged by dampness so it fails to open, etc. Also the battery may be internally damaged by sediment or have a broken cell retainer which allows leakage of the electrolyte.

To install a high-tension magneto on a Chevrolet remove the igniter shown by the dotted lines in Fig. 5. You will have to make some kind of an attachment to fit on

the end of the horizontal shaft which drove the igniter mechanism and carry it through a hole drilled in the housing. This hole should be bushed as shown by A. The magneto must be mounted on suitable brackets clamped to the main frame member. About the only place you can put a magneto is between the engine and frame of the car and carry the drive to it by a chain. You can put shims under the magneto when it is necessary to tighten the chain drive. It is going to mean a lot of work to install a magneto and unless you have facilities for doing it, better not attempt it. If you are dissatisfied with the present ignition system, check up on it and make sure that it is in proper shape. You may decide to keep the installation as it is.

Charging with 220-Volt Circuit

Q.—Show a wiring layout for charging outfit using a 220-volt direct current. We want to step the current down to 110 and then run our light series in to reduce the current.—W. H. Williams, Silsbee, Tex.

The diagram in Fig. 4 shows the wiring. You need just twice as many lamps as when charging from a 110-volt circuit, as two 110-volt lamps must be connected in series across the 220-volt line. To charge a 6-volt battery from a 220-volt circuit in this way is very wasteful, as you actually use only about 10 volts out of the 220, the rest being used in the lamps. If you do considerable charging it would be better to get a motor-generator set, the motor being wound for 220 volts and the generator for about 10.

Ammeter on 1914 Henderson

Q.—Furnish diagram and information of how to connect ammeter to show charge and discharge on a 1914 Henderson model six-cylinder, 66 hp. This car is equipped with a two-unit Ward-Leonard system having the cutout relay under the seat, and two negative and two positive wires connecting on to the terminal block of the battery. We note the one positive wire will show the charge and the other positive wire connected to the same battery terminal shows the discharge.—E. A. Weinert Hardware Co., Columbia, Ill.

The ammeter must be so connected that the charging and lighting currents pass through it but not the starting current. Usually there are separate circuits for the starting motor and the lights respectively, direct from the battery, and all you have to do in that case is to remove the light wire from the battery terminals and connect the ammeter between the wire and the terminal.

Rebuilding

Oakland 32 Into Speedster

Q.—Show diagram converting Oakland 32 into speedster using same radiator and hood, without fenders or doors, with spring cushion seat and high back, top and wind shield, tire carrier in rear.—W. H. West, Tucson, Ariz.

In Fig. 7 you will find a suggestion for converting a model 32 Oakland into a speedster.

Hudson Super Six Into Racer

Q.—Show body design for converting a 1917 Hudson Super Six into a racer. Arrange place for two spare wire wheels.

2.—If geared up to 3-1, would this car go between 90-100 mph? That is, without any motor changes?

3.—If the valve lift were increased and larger valves put in, would this increase gasoline consumption to any great extent?

4.—Would you advise shortening the wheelbase?

5.—Without any valve altering, would this car be able to climb a fairly steep hill on second or low?—H. C. Welling, Portsmouth, Ohio.

M.P.H.	ENGINE SPEED HIGH GEAR		HP DEVELOPED
	R.P.M.	H.P. REQUIRED	
5	210	.6567	4.3
10	420	1.3134	9.5
35	1470	12.260	33.0
	1800		(MAX.) 35.8

MODEL	STARTING MOTOR REV'S	ENGINE REV'S
85-B.O.E.	11.08	1
85-4	11.08	1
85-6	11.00	1
88-4	10.16	1
88-8	10.16	1
89-6	11.33	1
90-	10.08	1

Fig. 8—Chart of Overland horsepower, engine, speed, etc.

1—This car converted into a speedster is shown in Fig. 10.

2—No. Tuning a car for speed does not mean merely to change the gear ratio. Weight distribution, carburetion, ignition, valve setting, lubrication, etc., all come in for their share of attention.

3—Not necessarily. The cylinders can take in just so much gas and by increasing the valve diameter you give it a better chance to get into the cylinders quickly.

4—Shortening the wheelbase is advisable, but at the same time it means a great deal of work and if you simply want the car for road work, better leave it as it is.

5—If geared 3 to 1, yes.

Converting Mercer Into Speedster

Q.—I wish to cut down a model 35A. Mercer, the intention being to convert it into a racing type speedster.

1.—Where and how much should the frame be altered in order to shorten the wheelbase?

2.—Give the addresses of several makers of wire wheels.

3.—Publish a sketch of this car with shortened wheelbase and body of type used by the 22-73 Mercer, leaving gas tank between rear

wheels and vertical tire rack above and behind gas tank, and with turtle back behind seats and without fenders.—J. R. Pemberton, Louisville, Ky.

1—When you come to alter the wheelbase of a car you are undertaking quite a task, for not only must the frame be shortened, but the drive shaft and tube, brake rods, etc. The frame can be shortened by sawing out a section of it at the rear and butting the ends together. To hold the joint a piece of channel-section steel is placed on the inside of the frame members and riveted in place. If possible a cross member should be installed about a foot or so on each side of the joint, being fastened to the main frame members with angle plates or gussets. Cut out enough of the frame so that the wheelbase will be reduced to about 105 in. This is a good length of wheelbase for fast road work.

2—Wire Wheel Corp. of America, Buffalo, N. Y., Hayes Wheel Co., Jackson, Mich., Mott Wheel Works, Utica, N. Y., Standard Roller Bearing Co., Philadelphia, Pa., Spranger Wire Wheel Co., Detroit, Mich.

3—A suggestion for this is shown in Fig. 9. The dotted lines are those of the original body and you will note that the wheelbase has been shortened considerably.

1912 Everitt Into Speedster

Q.—Show diagram for making new body on a 1912 Everitt. As it has 35 by 4-in. wheels, I believe it would make a snappy roadster or racing car. Would it be possible to utilize the present large oval gas tank and use a couple bucket seats?—J. G. Campbell, Toronto, Canada.

An illustration showing the transformation of a 1912 Everitt into a speedster is shown in Fig. 6. You can build the rear deck to cover the oval gasoline tank leaving a suitable opening in for the filler cap to come through. The construction shown provides space to carry two extra tires and the driver and passenger sit in bucket type of seats.

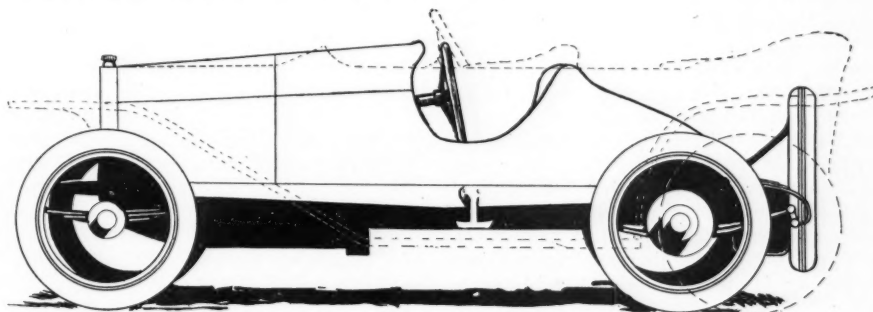


Fig. 9—Idea for changing Mercer into a speedster with shorter wheelbase

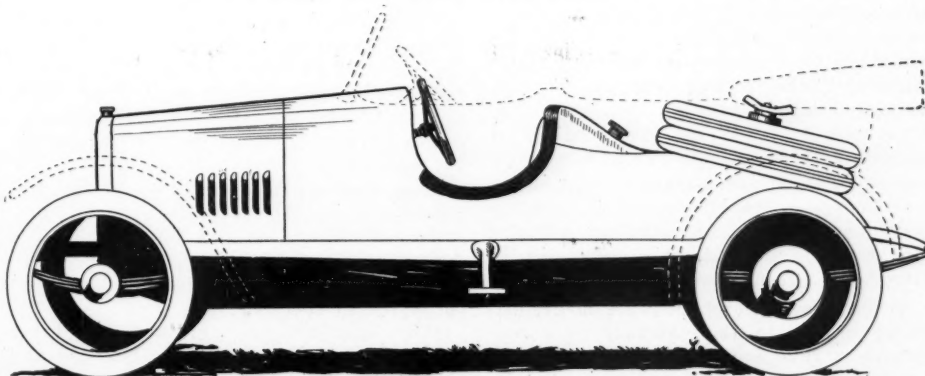
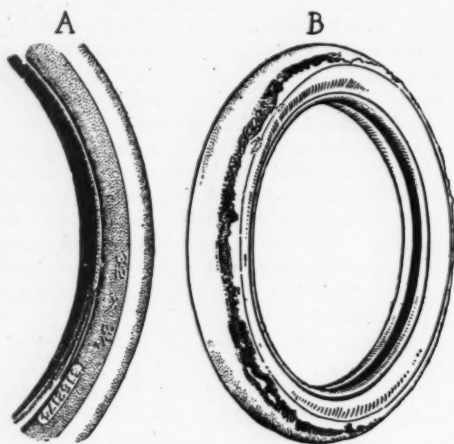


Fig. 10—Design for speedster made from a 1917 Hudson Super-Six

The Motor Car Repair Shop



What running in street car tracks will do to tires

Hints on Soldering

IN soldering two surfaces it is very necessary that both be clean and bright. The work must not be touched with greasy hands, nor must the tools be dirty. A clean file, scraper, emery cloth or a little uncut acid is generally used in preparing the surfaces, after which they should be swabbed with prepared acid. The latter is simply muriatic acid into which pieces of zinc have been introduced. Enough zinc is added until the action of the acid ceases. Let this solution stand for a day, then carefully pour off the clear liquid or filter it through a clean piece of blotter paper rolled into a cone or funnel shape with the smaller end closed. Add to the solution a teaspoonful of sal-ammoniac and when thoroughly dissolved, it is ready for use.

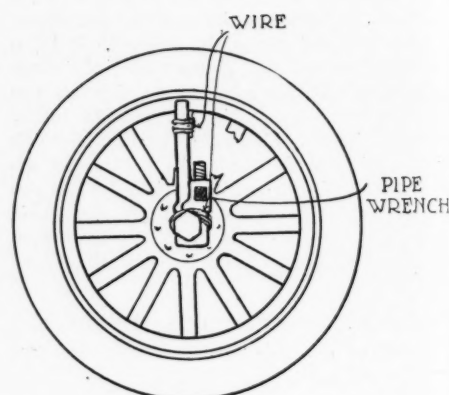
Keep the soldering acids, etc., in suitable receptacles. One of the best ways is to have a large-necked bottle for holding pure acid used for cleaning the work to be soldered and alongside of this two earthenware jars, one holding dilute cut acid for cleaning the coppers and the other cut acid, which is used as a flux and applied to the joint just before the solder. Wooden sticks are used for applying the acids. The operation of cleaning an iron consists of dipping it into the dilute acid for a

second. The three receptacles can be housed in a sheet metal tray filled with sawdust. The sawdust serves not only to absorb the dripping of acid, but assists in holding the jars in place.

Tires Beyond Repair

Illustration A shows a clincher tire that has been used on a straight-side rim. The toe of the bead has become flattened and the abnormal strain has resulted in the bead being torn loose, so that the tire is hopelessly beyond repair. Under no circumstances should a clincher tire be applied to a straight-side rim.

The other illustration shows a tire that has had to struggle with car tracks. We like to drive in car tracks because the car runs so much smoother in them, but do we always think of the gerat havoc done to the tires? The rubber is worn down to



Roadside repair of two broken adjacent spokes on wooden wheel

the fabric in a line following the circumference of the tire. Also the fabric in the tire shown has become worn and blistered. There is no possible chance to repair a casing like this.

Roadside Repairs



Two adjacent spokes had been broken out of one of the front wheels leaving quite a section of the rim unsupported. The driver of the car searched his tool kit for available repair material and made a temporary spoke out of a large pipe wrench. The illustration shows how it was done. The jaws were clamped around the wheel hub and the handle of the wrench wired to the remaining stub of one of the broken spokes.

One Man on a Job

It is not good policy for the foreman of a repair shop to have one man finish a job that another has started. For instance, in a shop where many different makes of cars are overhauled, if one workman disassembles part of the mechanism of a certain car and another is required to reassemble it, much valuable time is lost by the latter in getting the parts back properly, while the man who removed them could accomplish this easily. Another point is that the sense of responsibility is quite destroyed by this practice and among good workmen this is important in encouraging good workmanship.

There are a number of systems in use in different repair shops as regards the disassembling and reassembling of cars. It is wise to have all of the men in the shop follow a definite system in setting aside parts that have been taken from a certain car. Each part of a car should have its place and every workman should know where to find the hood, carbureter or footboards of that car.

Lansing, Mich., Oct. 13—A complete line of truck, ambulance, hearse, bus and furniture bodies, designed particularly for mounting on Reo chassis, is being manufactured by the Lansing Body Co. The ambulance body is paneled inside and out with vehisote panel, the inside being finished in grained mahogany, and fitted with a dome light and drop glass window in the rear door. A cot is suspended from the roof on springs, and two auxiliary seats are provided. If desired, this body will be fitted with a front door.

Two types of bus bodies are made, differing chiefly in the entrance door construction. The door on the No. 135 model is of the "folding-in" type, operated by

LANSING BODY LINE COMPLETE

the driver; that on the No. 147 simply a single panel door. Both are of fourteen-to sixteen-passenger capacity, having lengthwise seats, fitted with dome light, buzzers and rear doors.

The hearse body is 7½ ft. long, paneled both inside and out, with the interior finished in grain mahogany, stained and polished. It is fitted with full hearse hardware, electric lights, and flower rack. The windshield and rain vizer are of the built-in type. The rear doors may be held open or closed by special stops.

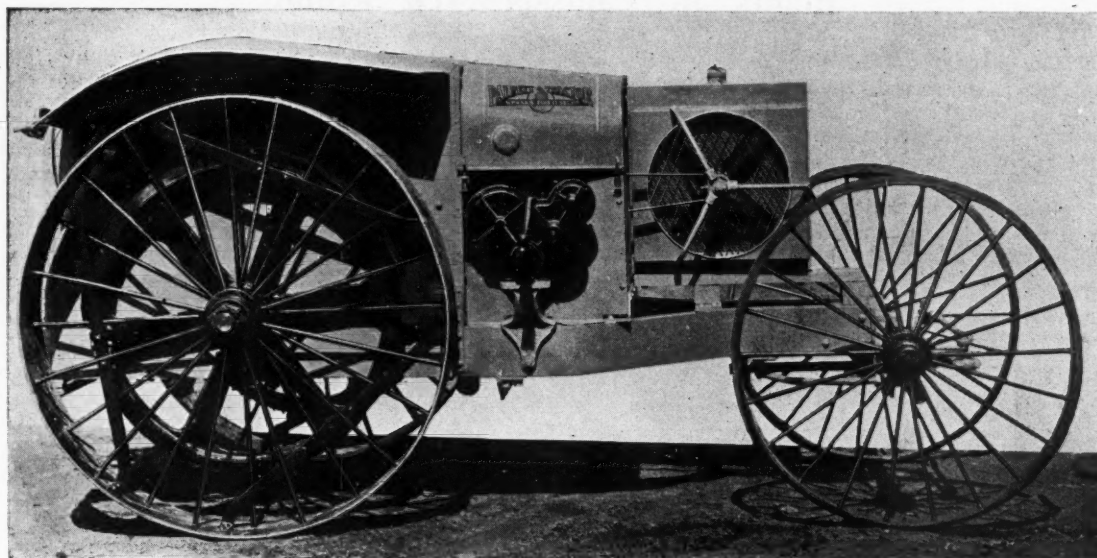
For light delivery purposes, two types of paneled bodies are made, No. 150 and No. 112. Both bodies are 83½ in. long,

39¾ in. wide at the narrowest part, 54 in. high, and paneled throughout in vehisote panel. The difference between the two is that Model 150 has oval doors in the body sides and rear doors.

The bodies of the furniture type, No. 126 and 137, are each 5 ft. wide and 10 ft. long, having 20-in. panels. The latter is equipped with a cab; the former, the usual folding top. In addition, two types of platform bodies, No. 140 and No. 117, are offered. No. 140 body is 5 ft. wide, 9 ft. long, and is complete with cab, seat and racks, together with tail gate and tarpaulin. The platform on No. 117 body is 58½ in. wide and 10 ft. long, complete with stakes, cab and seat.

Parrett Tractor a Four-Wheel Type

Direct-Driven Belt Pulley and Special Rear Axle



Side view of Parrett tractor showing the high front wheels and transverse engine mounting, which also is arranged for ready accessibility

FEATURES of the Parrett tractor, manufactured by the Parrett Tractor Co. of Chicago at its works in Chicago Heights, Ill., are a low center of gravity; flexibility of the running gear, permitting it to accommodate itself without strain to uneven ground; a short turning radius, notwithstanding the use of large diameter front wheels; transmission through spur gears exclusively, and the mounting of the belt pulley an extension of the engine shaft, thus eliminating gearing in the belt drive.

Aside from the engine, practically every part of the tractor is built in the Parrett works. The engine is a Buda model TU, a four-cylinder design of $4\frac{1}{4}$ in. bore by $5\frac{1}{2}$ in. stroke. Some few additions to the engine are made by the Parrett company to adapt it to this particular line of work. Thus, for instance, a large sediment trap is fitted to the bottom of the crankcase at the center, this being made necessary by the fact that tractors are usually enveloped in a cloud of dust and it is impossible to keep all of the dust out of the engine.

Kingston Carbureter

A Kingston $1\frac{1}{4}$ -in. carbureter is fitted, and the engine will operate either on gasoline or kerosene. It is usually equipped for the use of kerosene, the Parrett company having evolved a special vaporizer. This vaporizer is fitted between the carbureter and inlet manifold. It consists of a casting in the form of a venturi tube with an integral jacket. The venturi tube is provided with circular flanges on the outside. The hot gases from the exhaust manifold as they pass down through a vertical tube are deflected and compelled to pass through jacket, except for a small fraction which escapes through a bypass in the deflector plate. The lower part of the vertical exhaust pipe is surrounded by an air heater.

On the inlet pipe directly above the vaporizer there is a water connection

which is controlled by a valve which can be conveniently operated from the driver's seat. In case the engine begins to labor or shows signs of overheating, the driver can admit a small amount of water to the cylinders through this valve, which will overcome the difficulty. The air is taken into the carbureter through a Bennett air cleaner which works on the centrifugal principle. The use of such an air cleaner, it is claimed, increases not only the life of the engine but that of the carbureter as well. A centrifugal governor is fitted to the engine, which connects to the carbureter throttle valve, and there is, of course, also provision for hand control of the engine speed. The hand control and governor control are so inter-connected, by means of an ingenious mechanism, that the throttle can be set by hand for any speed desired, within the normal working range, and the governor will keep the engine running at substantially this speed.

The clutch is of the three-plate type, consisting of two clamping plates which constitute the driven member and a central punched steel plate which has an asbestos facing on both sides and is driven from the engine flywheel through four integral lugs engaging into slots milled on the flywheel rim.

The gearset, which is located adjacent to the engine, gives a plowing speed of $2\frac{3}{4}$ m.p.h., a reverse speed of 1.8 m.p.h. and a road speed of 4 m.p.h.

The front axle is built up of one angle iron and one strap iron member, and the steering knuckles, which are of the motor car type, are placed directly between these members. A steel casting is riveted to the center of the front axle and serves for a pivot block. Through it extend a pivot bolt which is fastened into the front cross member of the frame as well as another cross member some distance back. Brace rods secured to the front axle and to the rear end of the pivot bolt give the axle

stability in a horizontal plane as a result.

Steering is effected by means of a hand wheel provided with a handle. A conveyor type of chain connects from a sprocket on this hand wheel to another sprocket secured to an internally threaded sleeve. Through this sleeve passes the threaded end of a long shaft extending lengthwise of the chassis.

A cast iron rear axle housing is used. The axle itself consists of a cold rolled steel bar $2\frac{3}{8}$ in. in diameter. The housing is secured to the frame by means of bolts which are babbitted in place. The front wheels are 46 in. in diameter and have a 4-in. rim, this being said to be the largest diameter front wheels in use on tractors of this power. The rear wheels are 5 ft. in diameter and have a 10-in. width of rim. Square skid rings 1 in. wide are shrunk on to the front tires.

Starts on Gasoline

For starting the engine use is made of gasoline, which is carried in a 3-gal. tank. The main fuel supply, which consists of kerosene is carried in an 18 gal. tank.

The Parrett tractor weighs 5200 lb. and develops 12 hp. on the drawbar and 25 hp. on the brake at 900 r.p.m. The belt pulley is 12 in. in diameter and has a 7-in. face. The wheelbase is 92 in., the width 72 in. and the over-all length 144 in. What may be described as the driver's compartment is inclosed on both sides by upright steel plates secured to the frame side members and the dashboard back of the engine, and to these plates are secured rimmed guards over the wheels and protecting guard plates over the bull rings and pinions. An interesting feature of the tractor is that it is self-steering in plowing. Two of the wheels run in the furrow and once the tractor has been brought into the right position the driver is absolutely relieved of the duty of steering, so that in cold weather he can walk beside the tractor to keep warm.

Nine New Bodies for 1918 Velie

Sport Model Added and Refinements in Chassis Are Found

VELIE BILTVEL sixes for 1918 are larger than their predecessors. There are nine body styles for 1918. There are two chassis the same as previously, but the smaller this year is larger than last year. A special sport model is among the additions. Not only are the new models larger but in addition to the bringing together of well-recognized component parts there have been refinements not looked for generally

in cars of this price class. Moreover, the new Velies have a more graceful curve of body lines, a higher grade of upholstery and finish and many refinements of detail that were not found in their predecessors.

This year the smaller of the two chassis is designated as the 38. It is fitted with a six-cylinder Continental engine with a bore of $3\frac{1}{4}$ and a stroke of $4\frac{1}{2}$ in., this being $\frac{1}{4}$ in. longer stroke than the smaller engine

last year. This engine develops in excess of 40 hp. and has a wide range of speed and flexibility. Remy starting, lighting and ignition is a part of the engine assembly. A completely inclosed disk clutch and three-speed gearset are in a unit with the engine, all hung at three points with the engine.

Hotchkiss drive which has been a feature of Velies for a number of years is retained as is also the Timken rear axle, which is spiral-bevel gear driven with Timkin bearings throughout. The front axle also is a Timken fitted with bearings of the same name. Refinements in mechanical design are evident. For example, all electric wiring is inclosed in metal conduit with protecting fuses on each service. The radiator is larger and deeper; headlights are rigidly mounted on tubular standards.

In body design, however, the new Model 38 is strikingly different. The higher radiator produces a hood line almost horizontal back to the sloping windshield while the roll of the body sides continues unbroken from the nose of the radiator to the rise of the rear seat. Both front and rear seat backs are higher and more deeply cushioned over springs of more than usual resiliency. The seats tilt back comfortably and are upholstered in plaited French leather.

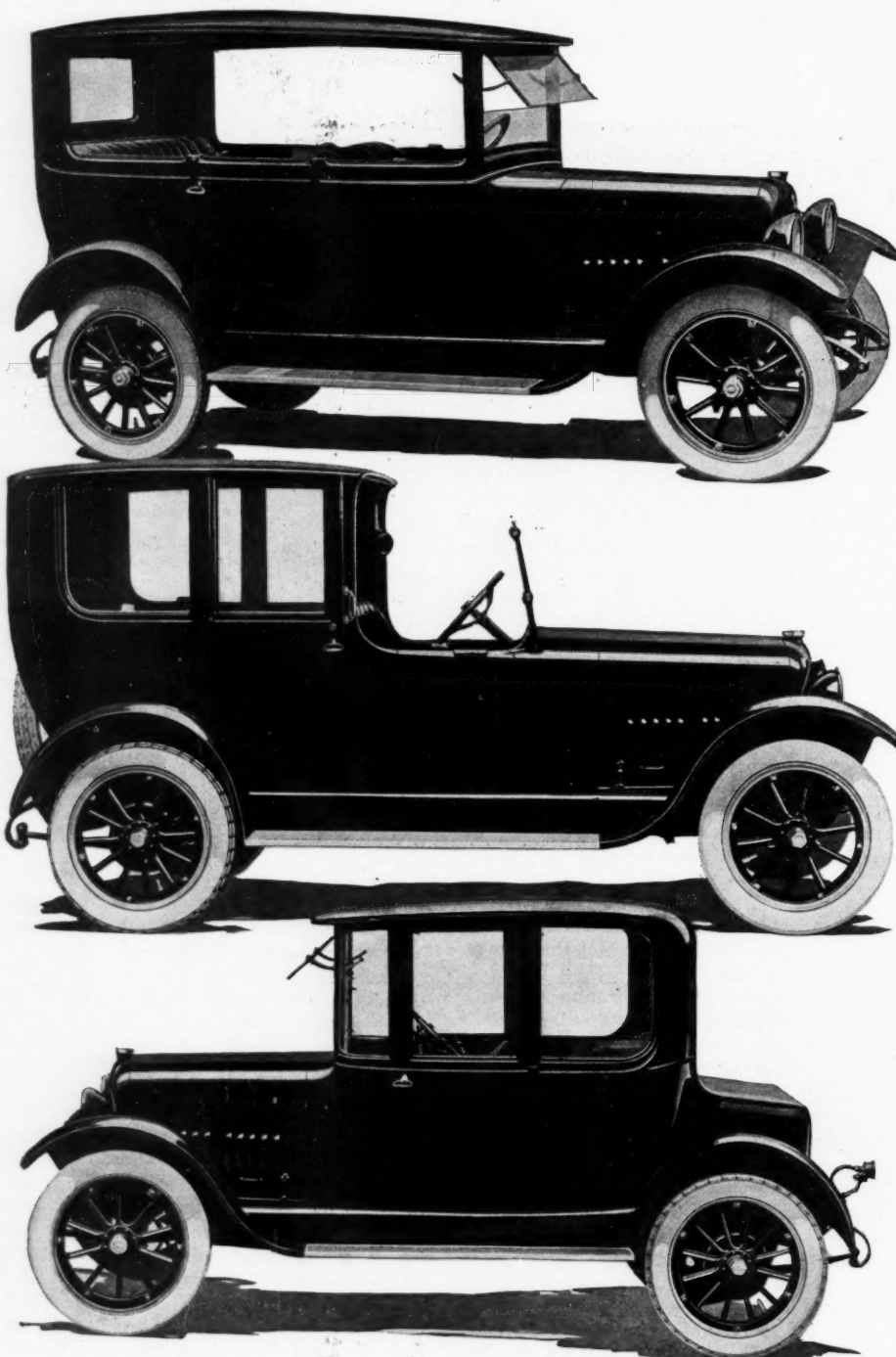
All instruments are neatly arranged on the cowl board. Control is center and pedals are adjustable to fit the driver. The top is of weather-proof Drednaut material, is provided with winter curtains that open with the doors and in the equipment is Stewart vacuum feed, Rayfield carburetor and 60-mile speedometer. The 38 chassis is fitted with 32 by 4 tires and the wheelbase is 115 in.

New Body Styles

Six other body styles are available on the 38 chassis, all of which are new. The four-passenger roadster has a double cowl body with greatly increased room; the two-passenger roadster has new lines; the coupe has seating room for four; the cabriolet with large side windows has seats for three. A five-passenger touring sedan with staggered doors and a reversible front seat and a brougham or town car complete the styles on this chassis. All closed models carry a Perfection exhaust heater as stock equipment.

The larger chassis, known as the 39, has a wheelbase of 124 in. It uses a Continental engine, $3\frac{1}{2}$ by $5\frac{1}{4}$. Mechanically this chassis is the same as the 38, except of heavier proportions. Two body styles are fitted—a seven-passenger which is large and roomy with straight lines and a double cowl, and a strictly original sport model. The extra seats in the seven-passenger fold into the backs of the front seats without the use of curtains or covers. Natural wood panels in both front and rear compartments give a touch of distinction. Tires are 33 by $4\frac{1}{2}$ in.

The sport model is a four-passenger, low hung with deep seats. Individual steps



At the top is the new Velie Biltwel sedan which sells for \$1,835; center—the town car, which lists at \$2,400, and below the cabriolet, which is listed at \$1,750. In addition there is a coupe that makes up a list of four closed car models

replace the customary running boards. The exhaust manifold extends through the engine hood and to the rear in a long graceful sweep. A two-way valve permits of silencing the muffler or giving it free vent. In the equipment of the sport model are spotlight, Moto-Meter, power tire pump and Victoria top with roof extension and side curtains.

Prices of the Velie line are: Five-passenger touring, four-passenger and two-passenger roadster, \$1,265; seven-passenger touring, \$1,595; cabriolet, \$1,750; sedan, \$1,835; coupe, \$1,850; sport model, \$1,850; town cars, \$2,400.

Six Body Styles for 1918 Jackson

SIX body styles on one 118-in. chassis makes up the Jackson eight line for 1918. Mechanically, the chassis is the same as last year with a few minor improvements, the main changes being in body style only. The line is made up of a five-passenger touring model at \$1,495; a four passenger, designated as the Flyer, at \$1,575; a four-passenger Cruiser at \$1,495; a two-passenger roadster at \$1,495; a seven-passenger touring at \$1,570, and a seven-passenger sedan at \$2,195.

The leader of the line is the Flyer model, which is a long and low racer type. This model is offered in a choice of four colors including the standard blue with black band and white stripe. There is a sudden drop from the cowl to the side in this model, which, with the straight line to the back of the car, gives it a touch of distinction. As the name Cruiser would indicate, this four-passenger model has the side body line dropping in a gradual slant from the cowl to the rear, which gives the impression of sitting in, rather than on, the car. The five and seven-passenger cars are somewhat similar in appearance, the former being constructed along more conservative lines.

Both cylinder blocks and crankcase on the eight-cylinder engine are cast in one unit, the cylinder heads being removable. The bore is 3 in. and the stroke $3\frac{1}{2}$ in. A Zenith-Duplex carbureter, with a separate mixing chamber for each cylinder block, takes fuel through a Stewart vacuum system from an 18-gal. tank in the rear. The clutch is a disk type and the drive is Hotchkiss without radius or torsion rods. The rear axle is floating, and both front and rear springs are full elliptic.

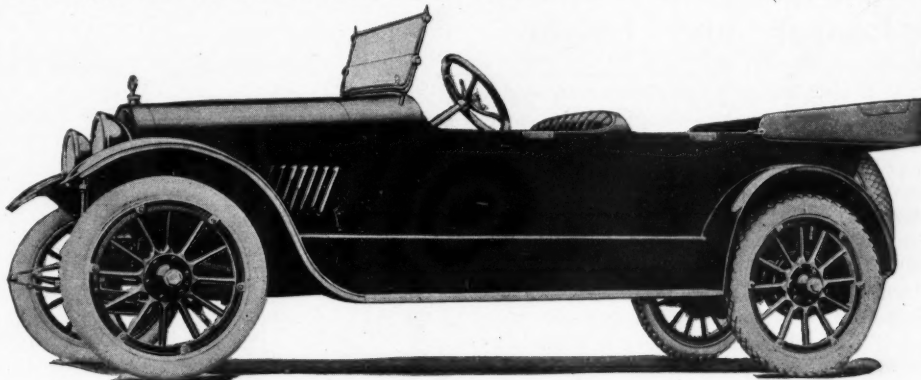
Auto-Lite starting, lighting and ignition is used. Tires are 34 by 4. The bodies of the open cars, with the exception of the Flyer, are finished in maroon with the chassis black and the wheels natural wood, but special colors may be had for an additional \$25. The equipment is specially complete and includes a Stewart tire pump driven from the transmission case. A special equipment of the Flyer model includes an eight-day clock, Moto-Meter, tonneau light and cigar lighter.

COMMERCE PRODUCES NEW UNIT

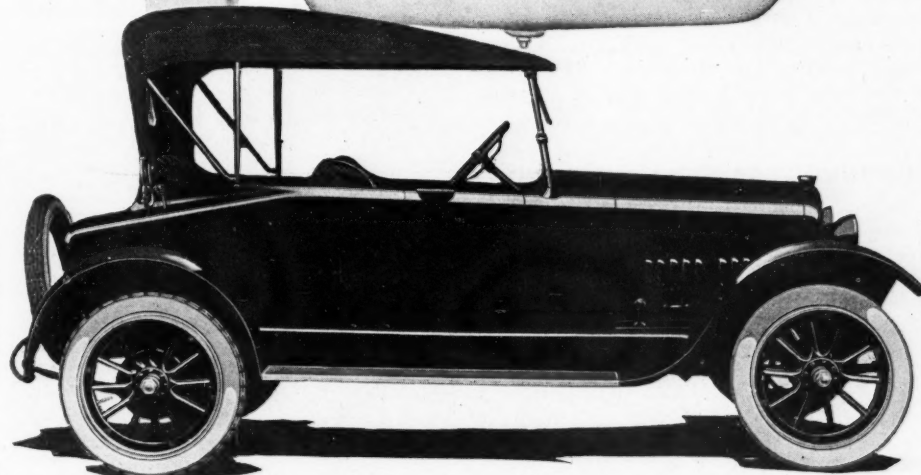
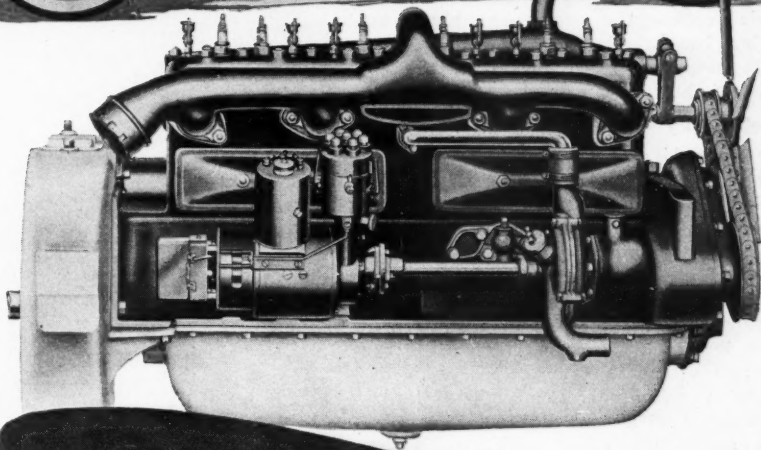
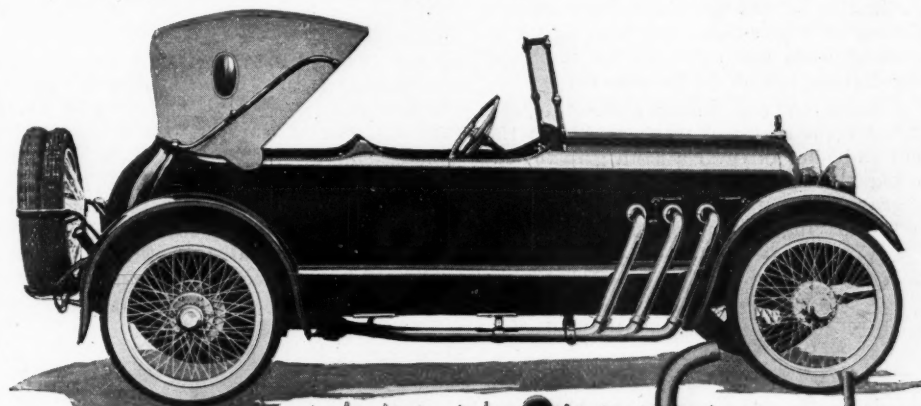
Detroit, Oct. 12.—A complete 3-ton semi-trailer and tractor unit, selling at \$2,090, has just been brought out by the Commerce Motor Car Co., Detroit. The outfit consists of a model E, 1-ton Commerce chassis and a

King Trailer Co.'s two-wheeled, semi-trailer with a King-Irwin fifth wheel. The semi-trailer wheels are fitted with 34 by 5 solid rubber tires. The load space is 5 ft. 6 by 14 ft. This unit is all ready for immediate delivery, and has been offered to meet the

shortage in 3-ton trucks caused by large Government purchases for this capacity. The outfit may be converted back into a conventional 1-ton Commerce truck in an hour by the removal of the fifth-wheel device.



Four-passenger 1918 Jackson car, which is called the Flyer model



Above is the new Velie sport model which is equipped with a Victoria top and in which the exhaust is brought out through the hood. In the center is the type of Continental engine used in Biltwel sixes and below the four-passenger Velie

New Suspension in 1918 Studebaker

Changes Make Series Longer and Lower

THE new series 18 Studebaker five-passenger cars are mounted on the same chassis as the previous models and both the four and six are interchangeable. Body lines remain the same generally, but changes in the front seat and spring suspension give the impression of a longer, lower car.

There is a difference in the seating arrangement of the five-passenger as compared with the seven-passenger Studebaker. Instead of individual front seats there is a straight seat, placed lower than the individual seats of the seven-passenger. The elimination of the auxiliary seats permits the use of a new limousine type foot rest made of wood and covered with the same material as that of the tonneau carpet.

A metal robe rail extends across the back of the front seat and its fastening to the seat embodies integral a hand grip for entering the tonneau. The tonneau carpet is gray, and metal bound linoleum is used in the driving compartment.

An adjustable tilting steering wheel supersedes the plain wheel of former models and is fitted with a corrugated rim. A new mounting giving a graceful tilt is used on the windshield.

Linoleum-covered, metal bound running boards replace the corrugated aluminum running boards of the preceding models. Safety step plates are placed at the entrance of the tonneau doors.

Wheels 36 by 4½

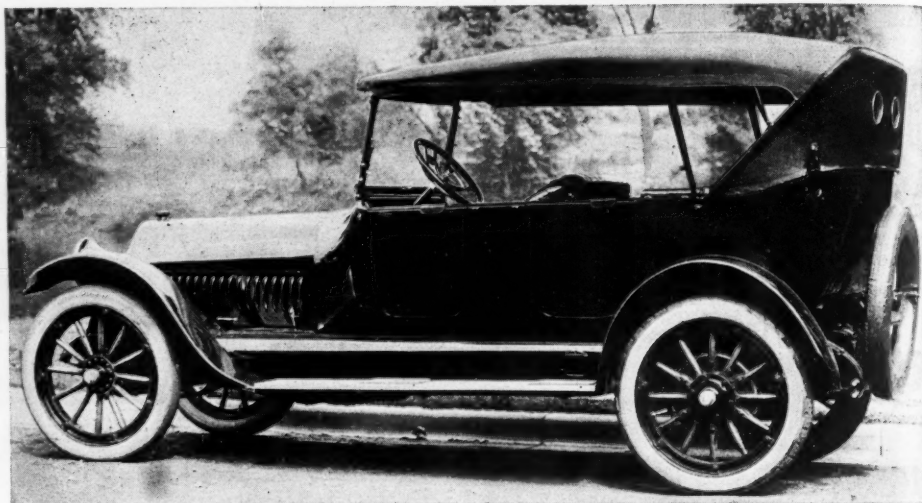
The wheels and rims are the same as on the de luxe models carrying tires 36 by 4½ in. About a third of the output will come through with natural finished spokes, the balance in black. There are two options in body color for both the four and six—Packard red and deep blue. Changes in the chassis include lighter rear springs placed lower on the axle. Instead of the plain glass lens in the headlamps, a deflecting type is used. The top is of imitation leather with drab lining. Rear windows are plate glass, nickel trimmed. Gypsy curtains are fitted also. The price of the four is \$1,050 and that of the six \$1,350.

DISTRIBUTORS VIEW OVERLAND

Toledo, Ohio, Oct. 12—The distributors of the Willys-Overland, Inc., met here this week to inspect the new light car announced in last week's issue of MOTOR AGE. It is this car that is to be produced for active competition with the Ford car.

1918 CROW-ELKHART REFINED

Elkhart, Ind., Oct. 15—The new line of Crow-Elkhart cars will be known as series K and consists of the following new models: Five-passenger touring car, \$935; five-passenger de luxe touring car, \$995; four-passenger de luxe cloverleaf roadster, \$995; convertible coupe, \$1,195; convert-



New series 18 Studebaker five-passenger, which sells at \$1,050 as a four and \$1,350 as a six

ible sedan, \$1,275. Wire wheels will be furnished for \$100 extra.

Mechanically the cars are improved and refined over preceding models. The chassis has a unit powerplant, Borg & Beck clutch, Stewart vacuum feed system with the 12-gal. tank at the rear instead of under the

cowl as before, Timken bearings in all wheels and Hotchkiss drive.

The greatest improvement is in body design. The regular five-passenger has a torpedo body with slanting windshield. The upholstery is of long-grain leather, with pleated cushions 21 in. deep. The location of the tank at the rear instead of under the cowl gives 46 in. more leg room in front.

The four-passenger is fundamentally the same as last year, with slanting windshield, khaki top, nickel radiator and a better arrangement of controlled instruments. The sedan has new dome lights and other improvements.

GRADE CROSSING LAW UPHELD

Trenton, N. J., Oct. 12—The New Jersey law requiring railroads to do away with grade crossing has been upheld by the courts in a decision that declares the law constitutional.

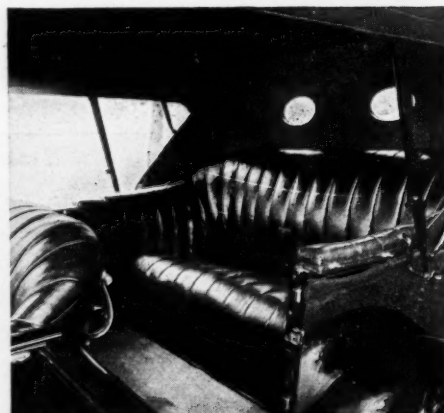
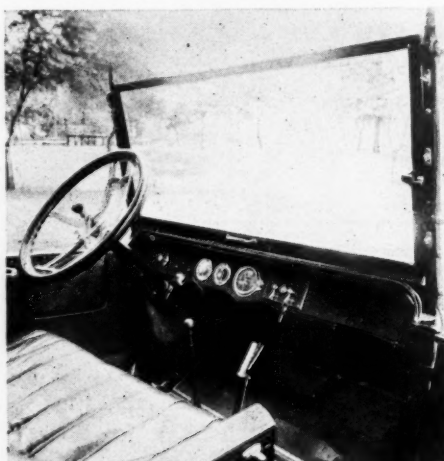
FOUR-WHEEL DRIVE CAR

Akron, Ohio, Oct. 12—The Mackey Motor Co. has been capitalized for \$250,000 and plans to manufacture a four-wheel-drive motor car. J. C. Mackey is president and manager; J. A. Backman, vice-president; A. A. Miller, sales manager; J. A. Seller, secretary and treasurer; William Roberts, purchasing agent and construction engineer.

NEW WILSON TRUCK SOON

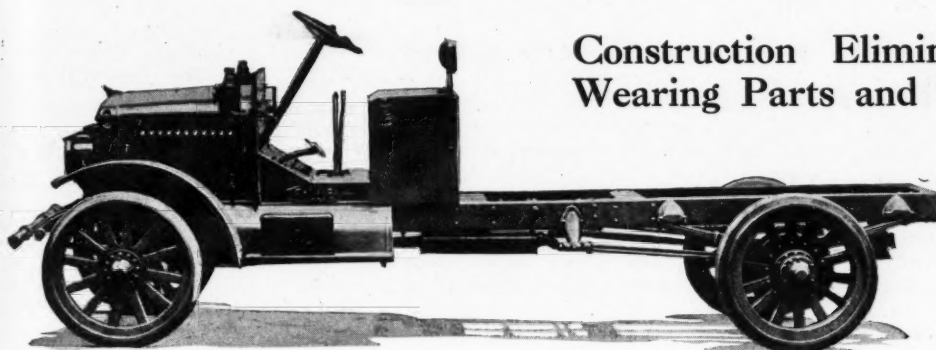
Detroit, Oct. 12—The J. C. Wilson Co. will bring out a brand new 5-ton, worm-drive truck on Jan. 1. It conforms in design and detail with the present Wilson 1, 2 and 3½-ton trucks. The Wilson company is tearing down two old buildings to make room for the addition of a modern structure for additional production.

All Wilson trucks now are fitted with a carbureting device permitting the engine to use either gasoline or distillate. This has been done to enable the Pacific Coast and Southwest owners to use distillate without any additional attachments.



A straight seat takes the place of individual seats in the Studebaker five-passenger, while the tonneau now has a limousine foot rest and hand grip for entering

No Spring Shackles on Armleder



The Armleder 2-ton chassis which has a wheelbase of 166 in.

IN main characteristics the Armleder, 2-ton truck for 1918 is unaltered. There has been some improvement in appearance and refinement in detail, however. The outstanding feature is still the absence of spring shackles on the rear springs and on the rear ends of the front springs, while standard units are used throughout. The price of the chassis is \$2,800. The wheelbase is 166 in. and tires are 36 by 4 front and 36 by 7, rear. The truck is made by the O. Armleder Co., Cincinnati, Ohio.

The engine is a Continental, $4\frac{1}{2}$ by $5\frac{1}{4}$, with pump circulation, Bosch magneto, single ignition with hand control, Schebler carburetor and Pierce governor operated from the driveshaft, limiting the speed of the engine to 1,200 r. p. m. and the speed of the truck to 16 m. p. h. Fuel is fed by gravity from a tank under the seat. The clutch is a disk and is in unit with the gearbox. Both are made by Brown-Lipe. The gearset is selective and gives three speeds forward. The rear axle is a worm-driven Timken with a final ratio of $8\frac{1}{2}$ to 1. The steering gear is a Gemmer.

No Spring Shackles

As has been said the prime feature of this truck is the elimination of spring shackles and shackle bolts. The ends of the springs rest on blocks which are attached to the frame. It is said that forty-eight wearing parts are eliminated. Twelve oil cups requiring daily attention also are eliminated. The clips are U-shaped and are made accurately of one piece of round bar steel. They cannot creep on the springs. The spring pad is machined on one side to fit perfectly over the axle and on the other side is machined to fit the spring. All points of contact between the axle, pad, spring and plate are carefully white leaded so that air and water are kept out of the joints. They are so tightly joined as to make substantially one piece.

The ends of the springs rest under spring blocks which are castings attached to the frame. When the truck is empty, the load rests on the flexible tip of the springs, assuring the greatest flexibility and adapting the springing to the light weight of the load. When the truck is loaded the weight rests farther down on the springs where they are thicker and more resistant. Injuries from rebound is made impossible because the absence of shackles prevents the vicious jerk at the fastening which often

occurs with the ordinary spring suspension.

The front springs are free like the rear springs at the rear end, while a fastening with a very large bearing surface is provided at the front end. The radius rods are exactly the same length as the rear section of the propeller shaft and exactly parallel it. The result of this is that the weaving of the frame up and down affects the radius rods in exactly the same way that it affects the propeller shaft.

The rear brake rods are mounted parallel with the propeller shaft and radius rods. They are also about the same in length. They do not alternately set and release the brakes as the truck travels over rough roads. The pedal is so arranged that it has more throw than is ordinarily the case. It cannot strike the floor boards before the brakes have a chance to set. All moving parts in the brakes and brake rod hangers are bushed. Both foot and emergency brakes are internal expanding on the rear hub brake drums.

CONTEST FOR PACKARD SERVICE

Detroit, Oct. 13—The Packard Motor Car Co. is staging a contest among all its service to demonstrate the need of efficient service in motor car merchandizing. A convention of all the Packard technical service men was held at the factory, and methods of improving present service facilities were considered. At that time the rules of the contest were discussed, and everything put in readiness for the service stations to start the six-month contest.

The contest has been classified according to the relative service merit of each sta-

tion, regardless of the size, according to this schedule: Class A, excellent, 90 to 100 per cent perfect; Class B, good, 80 to 90 per cent perfect; Class D, poor, 50 to 65 per cent perfect; Class E, very poor, 0 to 50 per cent perfect.

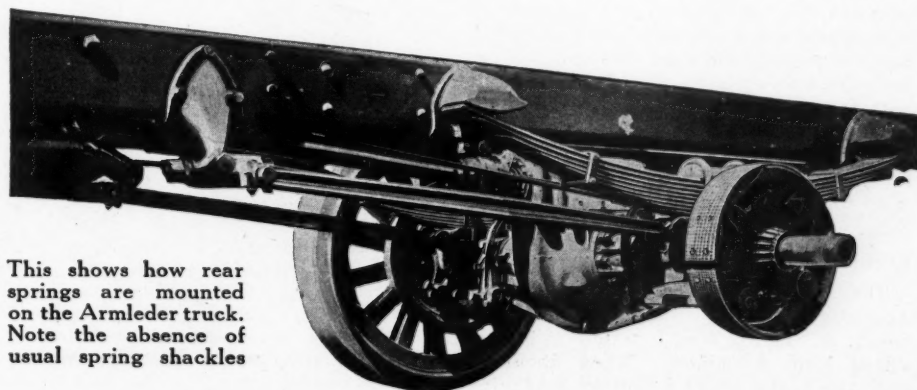
Each contestant remains in the group in which he starts and receives merits in proportion to the amount he benefits his service work during the contest. He can increase efficiency in any one or all three of the repairing departments, administration, actual repair or stock. Every member of each organization can credit or demerit his station by creditable or poor work. The basis of advancement depends on how much each better service is given.

A graphical record of the stations is kept in the factory on an efficiency contest board. This board is provided with five ladders, one for each group, and the stations are represented by numbered men climbing to the top. On this the status of each dealer is shown, and the progress each has made toward perfection may be seen at a glance. The standings will be changed weekly by the technical service department, and a fac-simile of the board sent to each dealer, showing the progress of the contest.

PORTAGE TO INCREASE STOCK

Barberton, Ohio, Oct. 12—Directors of the Portage Rubber Co. have called a special meeting of stockholders Nov. 20 to increase the authorized capitalization to \$10,000,000, half common and half preferred. According to the treasurer's report all the \$500,000 common and \$500,000 preferred recently offered to stockholders has been subscribed, and over half of the stock had been paid for in full instead of in four installments as was permissible.

Due to the fact that business has been practically doubling each year the officers state that the outlook for the coming season is bright and will doubtless surpass all past records.



This shows how rear springs are mounted on the Armleder truck. Note the absence of usual spring shackles

The Accessory Corner

American Cushion Springs

American cushions are provided for all makes of cars. The compound double-deck de luxe type consists of double-deck springs, the upper deck containing 120 small springs incased in separate cloth pockets, the lower, springs of larger and heavy wire. The smaller springs provide softness, while the larger absorb road shocks. Price, front seats, \$9; rear, \$10. Cushions of the Ford type are \$5 for the front seat and \$6 for the rear seat. American Cushion Spring Co., Kalamazoo, Mich.

Attwood Grease Machine

The Attwood grease machine carried 20 lb. of grease or oil in a metal container and pumps it directly to the desired point by a grease gun mounted at the side of the tank. A quarter-pound is delivered at each stroke. No. 3 cup grease or any oil not heavier than No. 1 transmission is pumped successfully. The tank is of heavy sheet iron; the pump, brass. All leather parts are treated to resist the action of the oil. Price, \$6. Fulton Sales Co., 910 South Michigan avenue, Chicago.

Victor Heater

The Victor heater is built on the same principle as the hot air furnace, circulating fresh air over a heated drum and sending it upward. The drum of the heater runs lengthwise at right angles to the exhaust pipe. The exhaust, coming direct from the engine, is turned into the drum, around which fresh air circulates and is heated, rising into the car. A cone-shaped spring in the drum absorbs the force of the exhaust, acts as a silencer and at the same time radiates heat outward toward the heating surface. The device can be attached in 20 min., it is said. To do so, the center floor board is raised, a V is cut out of the side of the exhaust pipe as near the muffler as possible, special packing is wrapped around the exhaust pipe, after which the fitting is put in place and tightened with a bolt. Floor board ends are furnished with the heater. After these are in place, the corners of the register are screwed to the floor. Price, \$5. Crew Leviek Co., Philadelphia, Pa.

Howe Tail Lamps

All Howe tail lamps are equipped with National Mazda 6-volt, 2-cp. bulbs. The lens are ruby semaphore, and the finish is high-grade black enamel. One model is made especially for Ford cars and has two bulbs and two plugs. One bulb is an 18-volt taking its current directly from the magneto when the engine is running, and the other is 3-volt connected to two dry cells. When the engine is idle, a throw of the switch to the dry cells continues the light. Howe Mfg. Co., Chicago.

Banner Signal Lights

The signal lamp made by the Banner Accessory Mfg. Co., 1314 South Seventh street, St. Louis, Mo., is a tail light and signal lamp combined. When about to stop, the brake raises a shutter displaying

the signal "Stop" on the back of the car. At other times the shutter is down and the red light shows as in an ordinary tail light. There are no levers or buttons to push. Price, lamp and all necessary attachments, \$5.

Carson Kickless Crank

The Carson crank consists of a few parts of case-hardened steel, and it is claimed there is nothing to break or get out of order. It can be attached by any motorist in a few minutes, using the ordinary tools of a car. The device is sold under a guarantee against injury from back-fire. Price, \$7.50. Carson Mfg. Co., Richmond, Va.

Splendola Body Finish

Splendola body finish is for application after a cleaner which removes the mud spots, rain spots, grease and corrosion. It is said the liquid wax produces a bone hard brilliant finish that is lasting and does not hold or attract dust. In addition the wax coating protects the finish of the car from the weather. For garage use a special body gloss is provided for application into damp

surfaces without a chamois. Price, Splendola finish, \$1. C. F. Roberts Co., Detroit.

GasK-Hots

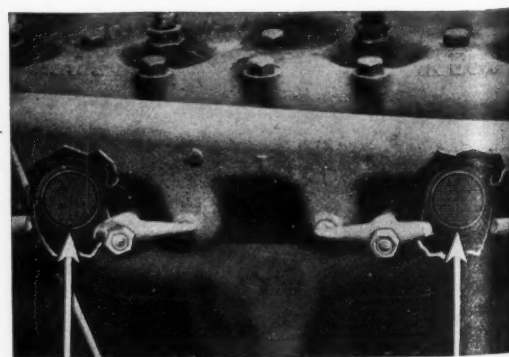
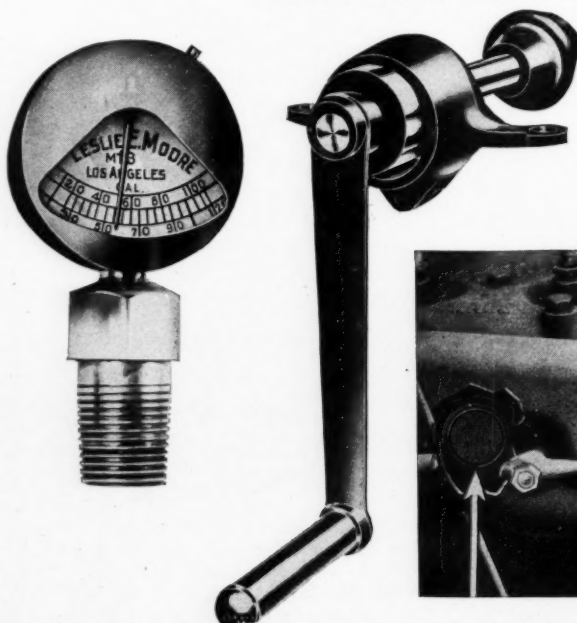
GasK-Hot is a device designed to increase gasoline economy. It is constructed of a special alloy which absorbs the engine heat and transfers it to the gas as it passes through from the manifold into the cylinder. In this way, it is claimed, it thoroughly breaks up and vaporizes the gas so that every explosion is perfect. It is said to save from 20 to 40 per cent of the fuel. Installation is with an ordinary monkey wrench. There are no holes to bore; the gaskets at the connections between the manifold and the engine are removed and replaced with GasK-Hots. Price, \$2. Consolidated Motors Co., Detroit.

Heath-Duplex Unit

The Heath-Duplex enables the owner to use his Ford car both as a touring car and as a 1000-lb. truck. The change from one to the other requires only a short time. The truck body folds up under the rear seat and when the tonneau is in place the car



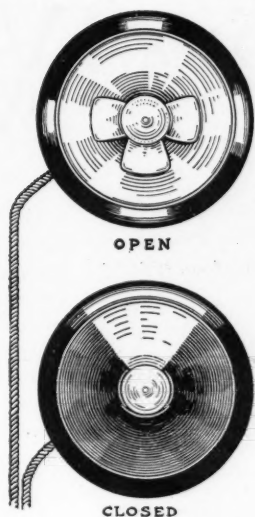
Victor heater, which utilizes the exhaust and operates on the principle of the hot air furnace



Left to right, Moore dual compression and air gage; Carson Kickless crank; and GasK-Hots installed between manifold and engine



Howe tail lamp, left, and
Butterfly light control



looks as it did before the attachment was put on. The attachment is composed of a new frame and a folding body. The tonneau is made to slide off, and the truck body unfolds. Attachment can be made in a few hours. The device has been tried out by demonstrations for two years. McCord Mfg. Co., Detroit.

New York Economizer

The New York economizer is an automatic device installed between the carburetor and intake manifold. It works in conjunction with the throttle and as the latter is opened more air is drawn into the manifold. It can be installed without drilling or tapping the manifold and it is only necessary to remove the two bolts that connect the carburetor to the manifold flange. Price, \$2. New York Coil Co., New York.

Butterfly Light Control

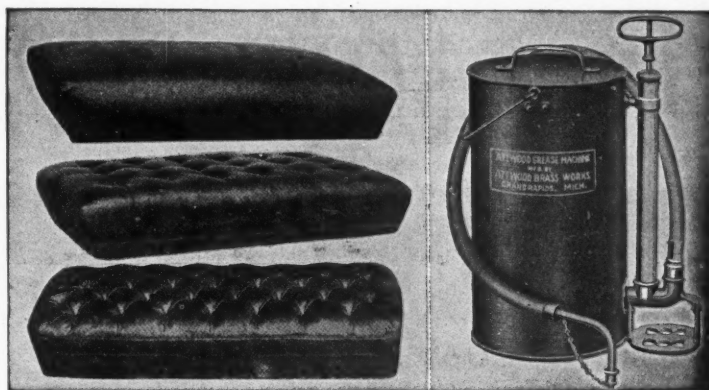
The Butterfly headlight control consists of three nickel-plated steel wings which fit over the lamp socket. A control wire housed in a coil wire connects these wings to the foot lever in the floor of the car, giving the driver control of the headlights at all times. The wings are folded over the lamp bulbs at the option of the driver and are said not to interfere with the lighting system in any way, at the same time meeting the requirements of light ordinance. Price, \$3.50 a set, complete. Sparta Mfg. Co., Grand Rapids, Mich.

Compression and Air Gage

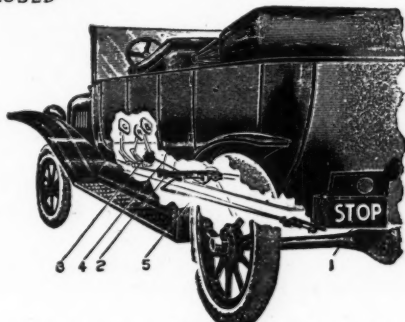
The base of the dual compression and air gage employs no friction. To utilize, the threaded end of the gage is inserted in the opening for spark plugs and the engine is turned by hand or starter with spark off. When the piston comes to the point of compression, the indicating hand on the face of the dial will indicate the pressure in pounds that the engine is turning up. To this $14\frac{7}{8}$ is added and the result is the correct compression admitted by automotive engineers, it is claimed. The gage also determines the condition of the rings without removing the head of the engine. Leslie E. Moore, 1042 South Olive street, Los Angeles, Cal.

Crowe Fan Belt

The Crowe fan-belt is called a mechanical fan belt made up by a series of wire links together with steel links fitted with leather blocks. These three parts



American double-deck cushion springs and the Attwood grease gun, which pumps grease or oil



Installation of signal light made by the
Banner Accessory Co.

constitute one link. By sliding out any leather section the chain opens and closes again when section is replaced, making it possible to add or remove any number of links to meet a certain length chain. No metal touches the pulleys. All danger of stretching or breaking practically is eliminated and the combination of steel and leather makes this belt impervious to oil, heat or water. Price, \$1 for cars from 1909 to 1916, while the 1917 and 1918 belt is \$1.10. Mechanical Belt Co., Chicago.

Peerless Spark Plug Pump

The Peerless spark plug pump is built so it can be installed on any upright engine by removing one of the spark plugs and installing a Peerless spark plug for Ford cars. The pump has a brass plunger fitted with two piston rings that prevent any of the engine discharge from entering the air chamber. To operate the pump handle is pressed down, which opens an air valve that fills the cylinder and prevents its explosion while the pump is work-

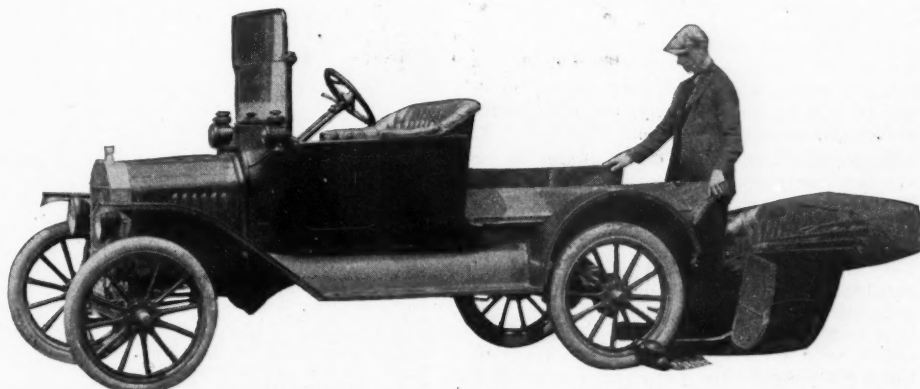
ing. The pump works from the operation of the other cylinder. The device is a permanent attachment to the car. William W. Plewes, Chicago.

Rhodes Ignition System

The Rhodes battery ignition system is an ignition system designed to replace the Ford magneto and coil ignition. The outfit consists of an elevated timer and distributor head driven by bevel gears on the end of the camshaft where the present timer is connected. The bevel-gear drive is inclosed in an oil-tight housing which fits the Ford engine without any machining or drilling of holes. The coil is of the non-vibrating type and replaces the present coil box. The same holes are used for attaching. The coil is provided with a switch and button which when depressed will start the engine when it is warm, instead of cranking it. The complete outfit consists of coil, distributor head and drive mechanism, switch and all necessary wires inclosed in a metal tube. Price, \$20. New York Coil Co., New York.

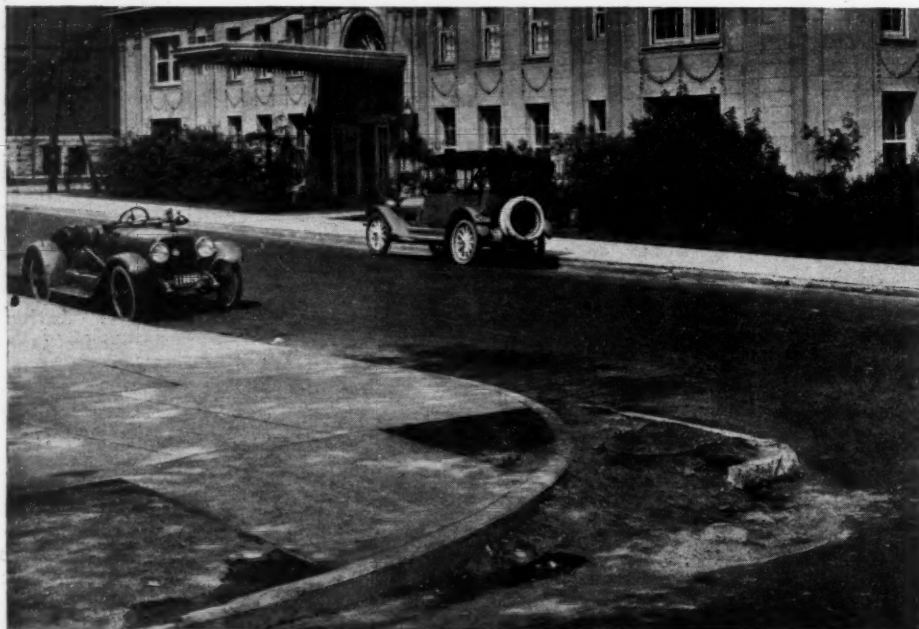
Motax Combination Stand

The Motax combination stand occupies a floor space of 28 by 34 in. and is made of wood. It embraces the three-point suspension idea in the matter of holding the parts, or assemblies, while being repaired. It will hold either the rear axle complete with driveshaft or the engine and transmission. The change of holding one or the other is made by placing two supporting blocks in position and removing the cross arm. No bolts or screws are used. It has a tool and parts tray conveniently located. Also a drip pan with sloping sides to catch oil or grease. Price, \$20—Motax Mfg. Co., Taylorville, Ill.



Heath-Duplex unit that permits use of the Ford car as passenger car or motor truck

From the Four Winds



MAKING THE CURBS SAFE—The photograph is of a long radius corner curb just completed at the intersection of Lake Shore Drive and Division street, Chicago, two heavily traveled streets, to make it possible for motorists to make the turn with only slight reduction of speed and without passing to the wrong side of the street. With the old curb of 1½-ft. radius, this was impossible. The new radius of 14 ft. prevents delay and congestion and promotes safety.

As the photograph shows, the old curb has not been removed. The distance from the old corner to the new is 7 ft. on one corner and 5 ft. on the other. Cars turning into Division have been forced to swing out into the center of the street or beyond, while the new curb permits a vehicle to make the turn with only slight speed reduction and without passing over the center line of the street.

MICHIGAN Licenses Hit New Mark—The licensed motor vehicles in the state of Michigan Oct. 1 amounted to 220,770, 60,000 more than for the entire year of 1916.

Canada Buying More Cars Now—After two and a half years' warfare Canada this year is buying 100,000 new motor cars, almost five times as many as were purchased during 1914 and an increase of 85 per cent over the normal for 1913 and 1914.

Canada Encourages Post-War Chauffeurs—The minister of public works at Toronto has announced that the government had decided to grant free registration to all the returned soldiers who choose the profession of a chauffeur on their return to civil life.

Armed Citizens Guard Highway—Twenty-five armed guards patrolled the Lincoln highway recently at a point near Newark, N. J., where the Pennsylvania railroad had petitioned for the right to lay a crossing at grade, to prevent laying of any track. More than 300 motor cars traveled this section of the highway in an hour the night before, and the citizens considered the crossing would be a death trap.

Huge Sum for Pennsylvania Roads—It is estimated that road work in Pennsylvania for 1918 and 1919 will cost the state \$17,000,000. The amount already has been appropriated for the purpose. More than a third will come from motor vehicle taxes and will be used only in maintenance of established state roads. Half a million will be used in taking over privately-owned toll roads, two of which are on the Lincoln highway, while \$6,000,000 is for new road construction.

Once Enemies; Now Co-Workers—When William Dearborn joined with the rest of Admiral Fletcher's marines in the attack at Vera Cruz, April 21, 1914, and the same day George Castillo helped defend the Mexican Naval Academy from the marines, neither would have expected they would be working in the same tire factory today, even if they had time to think it. But they are. Dearborn is a drill master for Goodyear, though he is to leave with the troops for France soon, and Castillo is a tire builder at the Goodyear factory. Both remember the battle, Castillo tell-

ing of the defense and Dearborn of the attack. Castillo had been a student at the academy, but hastily was commissioned a colonel when the American forces appeared.

Packard Holds Service School—To meet the need of technically trained men in the motor industry the Packard Motor Car Co. has opened a new technical service training school. The school is open to all men who have had any motor car experience, and each student will be paid while he is being taught. When he finishes, a position will be found for him in a Packard service station or at the main factory, where he will be paid the prevailing scale of wages.

Java Planter Takes Delivery at Plant—A. van Schermbeek, a tea planter of Sinagar, Preanger, Island of Java, stopped at the Chalmers factory Oct. 2 to take delivery of a seven-passenger car. With his friend, W. Westermann, Mr. van Schermbeek now is driving to the Pacific coast. After touring in the West they will embark on the "Koningen der Nederlanden" for Java, taking the new car with them. Mr. van Schermbeek is a

captain of the Volunteer Automobile Corps of Java. Each year the members of this corps are called out for fourteen days to play the war game.

Nevada Levies Funds for Roads—A general 7 per cent road tax has been levied in Nevada for road improvement under the supervision of the highway department. Federal funds to which the state is entitled will be added to this amount, together with \$25,000 appropriated by the last legislature from the state motor vehicle license tax. The highway department will have \$594,630 for cross-state roads, and the eight counties through which the Lincoln highway passes will have \$108,300 in addition for local road and bridge work.

Labor-Saving Devices in California—The California Highway Commission has introduced a method of saving labor in one detail of road work which is generally useful. The commission buys all the materials used on the roads it builds and furnishes them to the contractors. It owns motor trucks into which the materials are delivered from the railway cars. To load them quickly at the sidings, when ordinary shoveling is the method of transferring the materials from the cars to the trucks, it is necessary to have several men available for this work, and when the loading is not going on these men have other work provided for them or they will be idle. To reduce the number of men needed to a minimum, the commission has devised a system of boxes, which are placed along one side of the car to be unloaded. The outer side of these boxes can be opened like the tail of a dump wagon. A man is employed steadily filling these boxes, whether a truck is waiting for a load or not. When a truck arrives it is driven alongside the car, and the boxes are tipped up by a long lever, the outer side is released, and the contents dumped into the truck, which takes about 5 min. The truck then starts off on another trip and the shoveler in the car fills the boxes again. This system can only be used to advantage when enough trucks are used on permit the car to be unloaded promptly, but where such conditions exist it is stated to give good satisfaction and involve very little expense for the equipment.

Coming Motor Events

MEETINGS

Jan. 11-16—New York, National Association of Automobile Accessory Jobbers, convention.

SHOWS

Oct. 13-28—Dallas, Tex., state fair.
Nov. 5-12—Los Angeles, Cal.
Nov. 12-18—Denver.
Jan. 19-26—Montreal, Canada.
Jan. 26-Feb. 2—Chicago.
Feb. 11-16—St. Louis, Mo.
Feb. 18-23—Newark, N. J.
Feb. 18-23—Des Moines, Iowa.
Feb. 18-23—Springfield, Ohio.
Feb. 18-25—Pittsfield, Mass.
Feb. 18-27—South Bethlehem, Pa.
March 2-9—Boston.

Among the Makers and Dealers

METAL Specialties Adds—The Metal Specialties & Mfg. Co., Chicago, has added a new building, 100 by 160 ft., four floors.

Parker With United States Truck—L. T. Parker has joined the sales force of the United States Motor Truck Co., Cincinnati, Ohio.

McElwee Joins General Motors—R. J. McElwee, purchasing agent for the Detroit Specialties Co., has resigned to join the General Motors Co. at Pontiac, Mich. He is succeeded by J. H. Burnie.

Schooley District Manager for Commerce—A. Thomas Schooley has become district manager for the Commerce Motor Car Co. and will have charge of Texas, Oklahoma, Kansas and western Missouri.

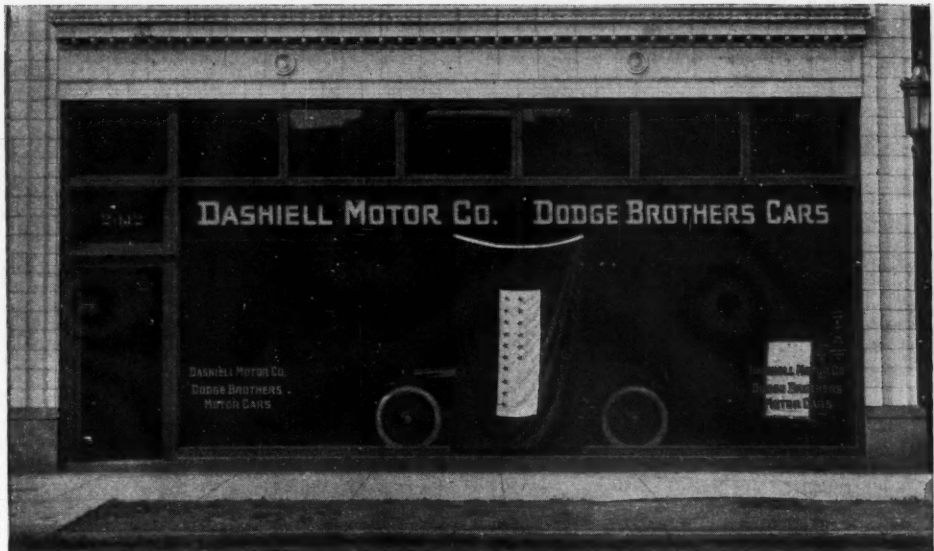
Perfex Radiator Promotes Kennedy—D. V. Kennedy, who has been representing the Perfex Radiator Co., Racine, Wis., in the Detroit territory, has been transferred to the headquarters office in Racine and will devote his attention mainly to the tractor trade.

Burnett in S. A. E. Work—Russell S. Burnett has been appointed assistant to M. W. Hanks, manager of the standards committee of the Society of Automotive Engineers. Mr. Burnett was formerly in the engineering department of the Bijur Motor Lighting Co., Hoboken, N. Y.

Cruiser Buys Site for Plant—The Cruiser Motor Car Co., Madison, Wis., has purchased a 2½-acre site for a plant. Contracts will be awarded about the middle of October for a main shop, office and transformer house costing about \$75,000. Eventually the investment will be in excess of \$200,000.

Duplex Makes Seventy-five a Month—If the business of the Duplex Truck Co., of Lansing, Mich., continues to increase as consistently as it has during the last three months, the directors of the company will maintain the Charlotte factory as a branch and will equip it for production work. The Duplex company now has an output of seventy-five motor trucks a month.

Tool Kits for Motor Vehicles—The Fairmount Tool & Forging Co. has been organized at Cleveland, Ohio, to manufacture tools and tool kits for motor cars, motor trucks, tractors and airplanes. The management has been associated with the tool-making business for ten years. The factory contains 16,000 sq. ft. of floor space and is fitted to expansion later. The officers are: President,



SIXTEEN FROM THIS AGENCY IN SERVICE—The service flag of the Dashiell Motor Co., Chicago, shows sixteen men have left its employ for war service. This was the first service flag to be displayed on Chicago's row of motor agencies and branches

J. Wentworth Smith; vice-president and sales manager, B. G. Gilmore; secretary and treasurer, Charles W. Yarham.

Bayne Now With Saxon—D. C. Bayne, who was formerly with the Chalmers Motor Co., Detroit, has become assistant comptroller of the Saxon Motor Car Corp.

Universal Body Buys Plant—The Universal Body Co., of Jonesville, Mich., has purchased the Deal Buggy Co. plant at Alma, Mich., and expects to have 100 men working within the next six months.

Karo to Take Western Output—The Karo Carburetor Co. has been formed in Chicago with a capital of \$50,000 to take the entire output of the Western Carburetor Co., Alma, Mich., and is making plans to handle 200 carburetors a day.

Lincoln Truck Starts Operations—The Lincoln Motor Co., Anderson, Ind., recently organized, has leased an industrial plant and started operations. The company will manufacture motor trucks. R. J. Walker, Anderson, is president; M. G. O'Brien, Evansville, Ind., vice president; Ernest Bausch, Detroit,

assistant manager; and Albert Lowman, Anderson, secretary.

Keenan Manager of Chicago Branch—P. C. Keenan has been appointed manager of the Chicago branch of the Pennsylvania Rubber Co.

Winterson is Now With Elgin—J. P. Winterson has resigned as zone manager of the Chalmers Motor Co. in the central southwest to join the sales forces of the Elgin Motor Car Corp.

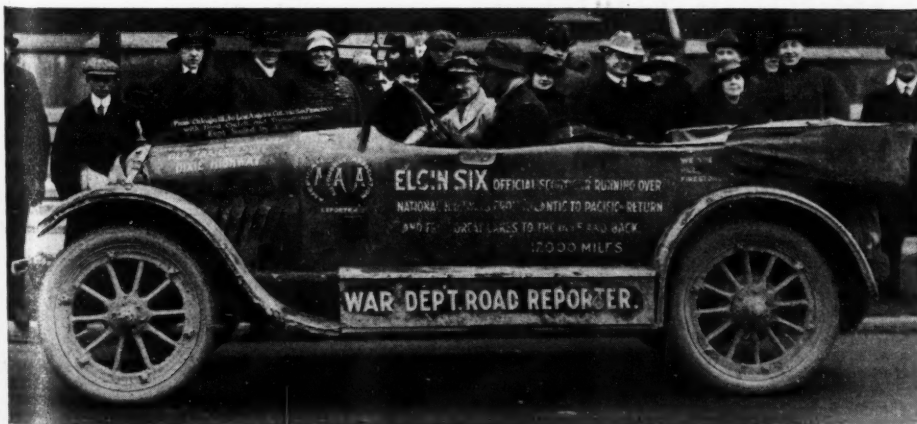
MacMullen Manages Chevrolet Branch—B. J. MacMullen, formerly general manager of the Hudson-Phillips Motor Car Co., of St. Louis, has been appointed manager of the Chevrolet factory at Fort Worth, Tex.

Bishop Joins Nash Motors—R. P. Bishop has resigned as sales manager of the King Motor Car Co. to become assistant sales manager of the Nash Motors Co., Racine, Wis. W. C. Hood is now sales manager for the King, as already told.

Goodyear Employees Start Tobacco Fund—Employees of the Goodyear Tire & Rubber Co., Akron, Ohio, have started a fund to buy "smokes" for the soldiers in France. By a special arrangement they will forward their money to a tobacco company, which will see that the soldiers get the smokes.

Siegerson Joins McGraw Tire—Edmund B. Siegerson, formerly branch manager for the Goodyear Tire & Rubber Co. at Albany and Buffalo, N. Y., and later supervisor of sales promotion work through the mid west, has been appointed sales promotion manager for the McGraw Tire & Rubber Co. with headquarters at East Palestine, Ohio.

To Distribute Miller Carburetor—The Harry A. Miller Mfg. Co. has arranged a contract with a concern known as the Miller Carburetor Distributing Corp., Los Angeles, Cal., which includes J. A. Roberts, H. D. Selleck and J. H. Devereaux, of New York, by which this concern will distribute Miller carburetors in the east and middle west for five years. The contract provides for immediate delivery of 2,000 carburetors and for the next four years minimum delivery of 700 monthly. Un-



ELGIN ROAD SCOUTS BACK AGAIN—This was taken on the return of the Elgin six sealed-bonnet road scout car from its 6000-mile trip, which is just half the mark set



WRENCH AND HAMMER REPLACE TOMAHAWK AND ARROW—Just a few miles from Fort Meigs, Fort Miami and other battlegrounds of "Tippecanoe" Harrison, "Mad Anthony" Wayne, Tecumseh and other warlike leaders of another day, in the main factory of Willys-Overland, Inc., are a score of full-blooded Indians—Chippewas, Navajos, Iroquois, Pomos, Pueblos—sent there by Uncle Sam from the western reservations to learn another of the trades of the white man. A dozen redskins are assigned to various duties in the assembly of one of the Willys-Overland models. One pair aids in chassis assembly; another pair assembles wheels; five of them are engaged in final assembly; while still others work on running boards, etc. Instead of being confined permanently to one operation, they are shifted to get a general practical knowledge

der the contract not less than 1500 carburetors a month are to be delivered in the territory during the five years.

Stutz to Build New Shop—The Stutz Motor Car Co., Indianapolis, Ind., will build a concrete and steel machine shop to cost about \$40,000 near the plant at Tenth and Roanoke streets.

Miller Opens Chicago Branch—Miller Carburetor Distributors, Inc., have opened a new branch and service station in Chicago. F. B. Lightner, an old racing driver and vice-president of the distributing company is in charge. James A. Roberts is president of the new distributing company; H. R. Devereux is treasurer.

American Malleables Promotes Smith—Pierce G. Smith, formerly assistant sales manager of the American Malleables Co., with offices at Detroit, has been appointed general sales manager of the company and will be at the main offices, Lancaster, N. Y. The company now has plants at Owosso, Mich., and Lancaster, N. Y., and makes mal-

leable castings for the motor car trade exclusively.

Kinsel Leaves Motor Products—Harry B. Kinsel has resigned from the Motor Products Corp., Detroit, to join J. P. Ryerson & Son, Chicago.

Hartford Branch Outgrows Space—The Chicago branch of Edward V. Hartford, Inc., has outgrown its former quarters and moved to a larger location. Ample space now is available for salesrooms, western executive offices and service. The present building is adapted exceptionally well to service, as there is room back of it for car equipment or adjustments.

Lawrie Is Commissioned by Army—Fredrick S. Lawrie, sales agent, Indianapolis, Ind., handling factory accounts on special automotive material, has been commissioned a captain in the ordnance section, Officers' Reserve Corps of the Army. During his absence his associate, James F. Lindley, will carry on the business.

Nordyke & Marmon Add Again—Nordyke & Marmon, Indianapolis, Ind., will construct additions to its plant to cost about \$120,000. This makes the third large addition built by the company during the last ninety days.

Beroth Leaves National for Indiana—O. S. Beroth has resigned as purchasing agent for the National Motor Car & Vehicle Corp., Indianapolis, Ind., to become manager of service for the Indiana Truck Corp., Marion, Ind.

Roth Resigns to Join Army—W. C. Roth, purchasing agent of the Detroit Lubricator Co., Detroit, has resigned and joined the United States army. He will purchase supplies for the Signal Corps.

Norwegian Engineers Organize—The American Engineers of Norwegian Descent have been organized in Detroit and includes many engineers prominent in the chemical world. Among them are Peter S. Stoontrup, head of the General Motors Export Co., and John Erickson, city engineer of Chicago, who is associated with the Air-O-Flex Automobile Corp.

Akron, Ohio—C. & C. Tire Sales Co.; capital stock, \$5,000; incorporators, R. E. Clark, Fred Booth, J. P. Cunningham, C. J. Hazen and L. F. Smith.

Akron, Ohio—Glass-Case Motor Co.; capital stock, \$10,000; incorporators, Walter E. Case, R. C. Glass, C. A. Myers, G. B. Motz and L. I. Moore.

Akron, Ohio—M. S. & M. Mfg. Co.; capital stock, \$250,000; incorporators, John C. Mackey, A. A. Miller, Frank Seizer, J. F. Sullivan and Charles K. Strobel.

Canton, Ohio—Benolst Aeroplane Co.; capital stock \$500,000; incorporators, Charles E. Benolst, J. A. Bernower, Charles A. Mullally, V. L. Ney and Ed. L. Smith.

Cincinnati, Ohio—Republic Truck Co.; capital stock, \$50,000; incorporators, H. P. Kelly, A. R. Hoffman, G. C. Kelly, I. W. Hoffman and C. J. Klump.

Cincinnati, Ohio—United States Truck Sales Co.; capital stock, \$10,000; incorporators, Arthur M. Peck, Stanley Shaffer, John L. Shuff, Frank H. Shaffer and John Weld Peck.

Cincinnati, Ohio—Arthur Barker Consolidated Auto Supply Co.; capital stock, \$5,000; incorporators, Arthur Barker, Samuel J. Greenwald, David H. Rosenbaum, Edith Harrison and Irwin D. Allen.

Cleveland, Ohio—Distributors Motor Sales Co.; capital stock, \$55,000; incorporators, G. M. Gallagher, W. J. Patterson and F. H. Reed.

Cleveland, Ohio—Eastern Accessory Co.; capital stock, \$25,000; incorporators, George S. Auer, W. M. Miller, F. L. Miller, U. R. Talbot and A. M. Ross.

Cleveland, Ohio—Pearl Mfg. Co.; capital stock, \$10,000; incorporators, J. H. Holmes, Harry Decker, Sam Goertz, Phil H. Langguth and Emil Griebel.

Recent Incorporations

Cleveland, Ohio—H. O'Neill Auto Co.; capital stock, \$10,000; incorporators, Hugo O'Neill, Alvord L. Bishop, M. S. Hubbard, Paul Apple and B. J. Sawyer.

Cleveland, Ohio—J. F. Reynolds Motor Co.; capital stock, \$10,000; incorporators, J. F. Reynolds, Ernest W. Branch, A. J. Dawson, Harry J. Reynolds and W. M. Opre.

Cleveland, Ohio—Aut-Rest Co.; capital stock, \$1,200,000, to operate a string of garages; incorporators, Alexander Lawson, William Smith, Kenneth MacKenzie, David Hodge and E. L. Carmen.

Cleveland, Ohio—Weigel-Warnsmann Wagon & Auto Body Co.; capital stock, \$20,000; incorporators, Henry Weigel, Katherine Weigel, Henry Warnsmann, Augusta Warnsmann and Sara C. Guest.

Columbiana, Ohio—Columbiana Garage; capital stock, \$12,000; incorporators, E. L. Dieffenbacher, H. H. Huntington, C. W. Huntington, Elizabeth Hammond and Hazel H. Roller.

Columbus, Ohio—Columbus Auto Garage Co.; capital stock, \$5,000; incorporators, A. L. Richards, M. I. Crellin, A. Crellin, H. L. Sup and Roy Van Wagner.

Columbus, Ohio—Lawwell-McLeish Co.; capital stock, \$15,000; incorporators, F. H. Lawwell, M. M. McLeish, E. K. Merwine, M. Bales and James Judge.

Delphos, Ohio—R. L. Peltier Tire Co.; capital stock, \$10,000; incorporators, R. L. Peltier, O. T. Ross, J. R. Tillotson, A. S. Perkins and M. A. Draitcourt.

East Liverpool, Ohio—Liberty Motor Sales Co.; capital stock, \$10,000; incorporators, E. H. Roth, T. P. Dalzell, William Jenkins, H. C. Fox and G. W. Myers.

Lorain, Ohio—Universal Bearing Co.; capital stock, \$10,000; incorporators, H. J. Yeckley, A. E. Robinson, Milton Hellmyer, Marian D. Hunt and A. A. Hees.

Massillon, Ohio—Canal Street Motor Car Co.; capital stock, \$25,000; incorporators, George B. McClelland, W. C. Fryer, W. M. Kasserman, J. B. Dewell and S. F. Bowman.

Niles, Ohio—Engel Aircraft Co.; capital stock, \$10,000; to manufacture airplanes; incorporators, Paul J. Bickel, C. A. Sanders, Sterling Newell, F. S. Whitcomb and C. C. Owens.

Toledo, Ohio—Fam-us Carburetor Co.; capital stock, \$50,000; incorporators, M. C. Boesel, R. Rath, R. E. Shook, C. L. Fallon and M. C. Moss.

Toledo, Ohio—American Magneto Co.; capital stock, \$400,000; incorporators, W. C. Carr, V. E. Russell, Irving E. Macomber, A. A. Meggett and W. C. Abbott.

West Middletown, Ohio—Orez Mfg. Co.; capital stock, \$10,000; incorporators, George D. Coddington, E. L. Coddington, Mary Coddington, Myrtle Coddington and Inez E. Coddington.

Willoughby, Ohio—I. M. Crowther & Sons Co.; capital stock, \$10,000; incorporators, I. M. Crowther, A. I. Crowther, L. D. Crowther, S. H. Crowther and J. W. Simmons.